ENGINEERING NEWS-RECORD

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A McGRAW-HILL PUBLICATION

Why Oliver offers two tractors for the same kind of work

Pictured above is the Oliver Super 55 wheel tractor. Below, the "OC-3" crawler. Both do the same kind of work. Both have mounted equipment that includes: front-end loaders, bulldozers, angling-blade and hydraulic 3-point hitch that takes scrapers, booms, forks, scoops, post diggers and many other tools.

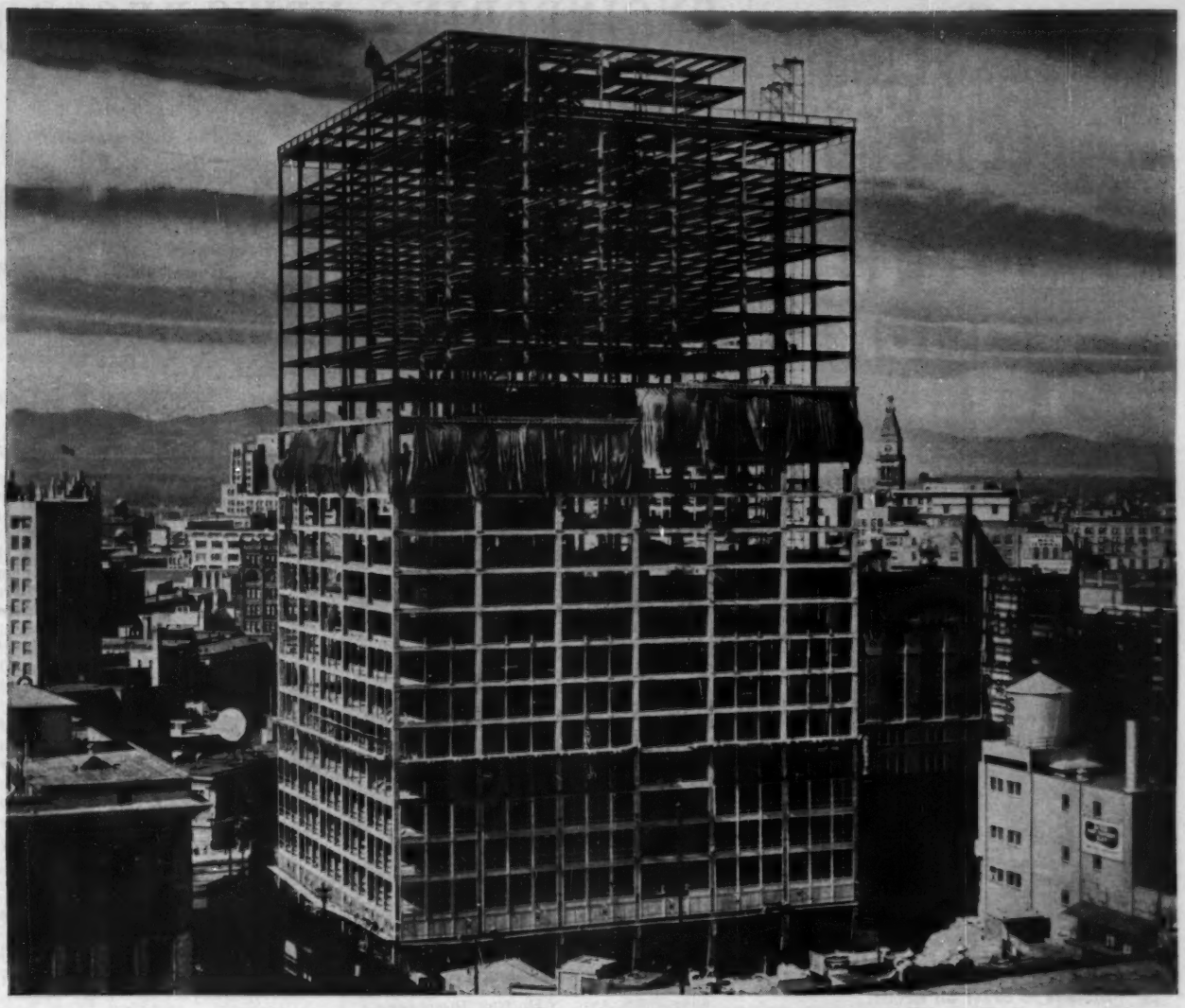
Together these two tractors can produce far more than a single larger crawler or wheel tractor. Put a loader on one, bulldozer on the other and you have a team for any job. A 3-point hitch on each tractor makes equipment twice as useful, half as expensive—buy one tool, use it on either machine. This interchange even includes an all-hydraulic ⅜-yd. backhoe.

These tractors are compact and easy to handle. They get around fast, work in small quarters, take little fuel and can be used in *two* places at one time! And when half this team is a crawler, your work continues year around, in all weather.

If your work does not permit two tractors, then pick the one that fits best, saves the most. The "OC-3" is gasoline powered, the Super 55 offers gas or diesel power. If you want to see these tractors and drive them yourself, or learn about the many mounted tools they use, call or see your Oliver Industrial Distributor.

THE OLIVER CORPORATION
400 W. Madison Street, Chicago 6, Illinois

A complete line of industrial wheel and crawler tractors



Bethlehem High-Strength Bolts were used in erecting this 23-story office building, principal structure of Denver's Mile High Center. With bolting keeping pace with erection crews, the 4600-ton steelwork was completed in 82 working days.

Steel erection moves fast with High-Strength Bolts

Steel erection moves rapidly and smoothly when Bethlehem High-Strength Bolts are used to join the structural members.

Bethlehem High-Strength Bolts save time and promote economy because they can be installed quickly by two men, one using a holding wrench, the other a pneumatic impact wrench. The hexagonal-head bolts are inserted with two hardened washers, one of which is placed under the head, the other under the hexagonal nut. When properly torqued, the bolts remain tight indefinitely.

Bethlehem High-Strength Bolts are furnished in carbon steel in all sizes from ½ in. to 1¼ in., and in varying lengths. Heat-treated by quenching and tempering, they fully meet the requirements of ASTM Specification A-325.

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BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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Single copies 35¢. Subscription rates—United States and possessions, $6.00 a year; $9.00 for two years; $12.00 for three years. Canada $8.00 a year; $12.00 for two years; $16.00 for three years. Other Western Hemisphere and the Philippines, $15.00 a year; $25.00 for two years; $30.00 for three years. All other countries $20.00 a year; $30.00 for two years; $40.00 for three years. Entered as second class matter October 29, 1936, at the Post Office at Albany, N. Y., under Act of Mar. 3, 1879. Printed in U. S. A. Copyright 1955 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved.

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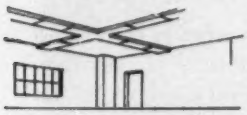
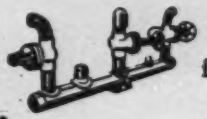
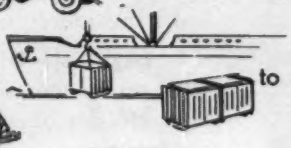
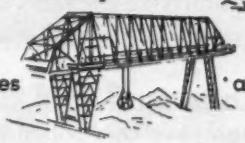
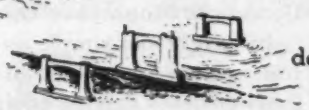
For instance, DRAVO and its Subsidiaries build towboats and barges... operate one of the largest barge lines on the inland rivers... manufacture heaters build pumphouses and intakes... install air conditioning  in all types of buildings... handle construction of power plants boiler plants and compressor and oil pumping stations . . . prefabricate and erect piping  for steam, gas, oil, water, etc. . . . construct water and waste disposal plants provide sand, gravel, ready-mixed concrete and builders' supplies for construction projects in the Pittsburgh district . . . furnish construction equipment on rental or sales basis . ... supply open steel flooring . . . manufacture Transportainers  to carry export shipments . . . build giant ore and coal bridges  and unloaders . . . construct gantry and floating cranes build bridge foundations  docks, locks and dams dredge . . . sink shafts, drive tunnels and slopes . . . operate one of the nation's most modern marine ways for river-craft repair . . . make crane cab coolers. DRAVO service is founded upon careful engineering, complete facilities and practical know-how.

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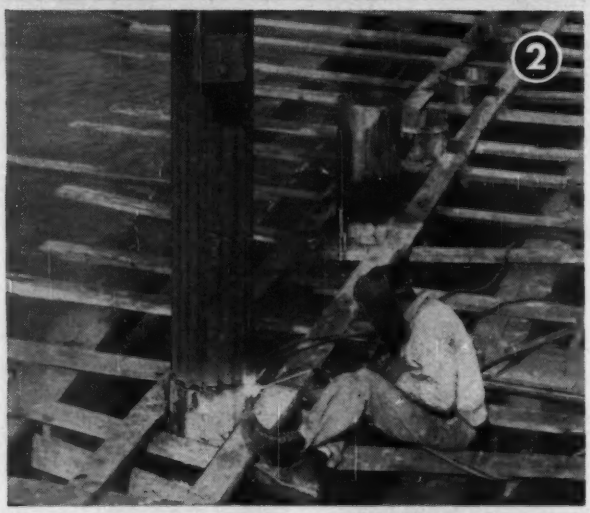
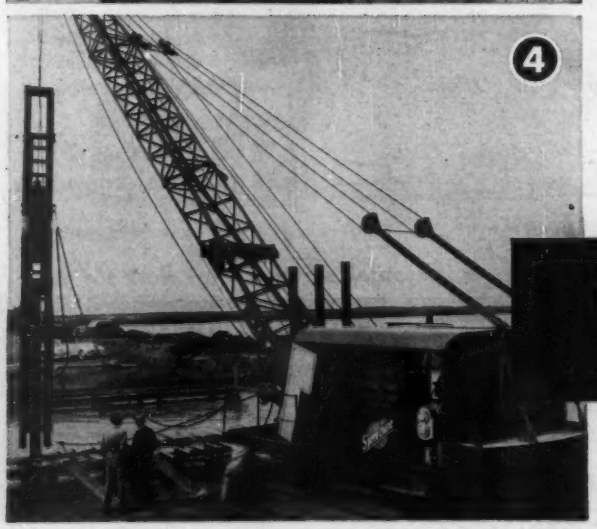




BIG SAVINGS ...4 WAYS with

MONOTUBE tapered steel piles

THE list of Monotube advantages is long. And you are welcome to *all* the facts . . . anytime. Meanwhile, think of the time and money you can save as a result of . . .

1. FIELD ASSEMBLY. Monotubes can be quickly, easily tailored to required length on the job, minimizing cut-off waste and saving time. Photo shows simplicity of nesting a Monotube extension with a "come-along" and two cable chokers.

2. SIMPLIFIED EXTENDIBILITY. When piles cannot be driven in one piece, Monotubes are readily welded and extended to *any* length as driving progresses. You eliminate complicated welding procedure by using a simple "girt" weld under normal driving conditions.

3. EASY CUT-OFF. With lightweight Monotubes, the cut-off operation is fast and easily accomplished. Careful use of cut-off sections as extensions minimizes waste.

4. DRIVING LONG PILES WITH SHORT LEADS. Because of Monotubes' cold-rolled strength, light weight and simple on-the-job extendibility, you can save the expense of special rigs, long leads or heavy driving equipment on tough jobs. Photo shows standard crane with short lead driving 150-ft. Monotube, in sections, 58 feet from shore.

For complete information, for more evidence that you'll be 'way ahead with Monotube piles, write to The Union Metal Manufacturing Co., Canton 5, Ohio.

UNION METAL

Monotube Foundation Piles

B.F.Goodrich

All-Nylon All-Purpose tires help build Kansas county highways

TWENTY-EIGHT units are constantly kept busy building and maintaining the network of roads that crisscross Marion County, Kansas. Tons of fill dirt, rock and gravel must be hauled 48 hours a week over back roads, often over no roads at all.

MASSIVE CLEATS in the All-Purpose tread are curved for greater gripping action. "Buttons" on alternate cleats defy slippage. And the center rib of this BFG tire widens as it wears, putting more and more rubber on the road for longer service.

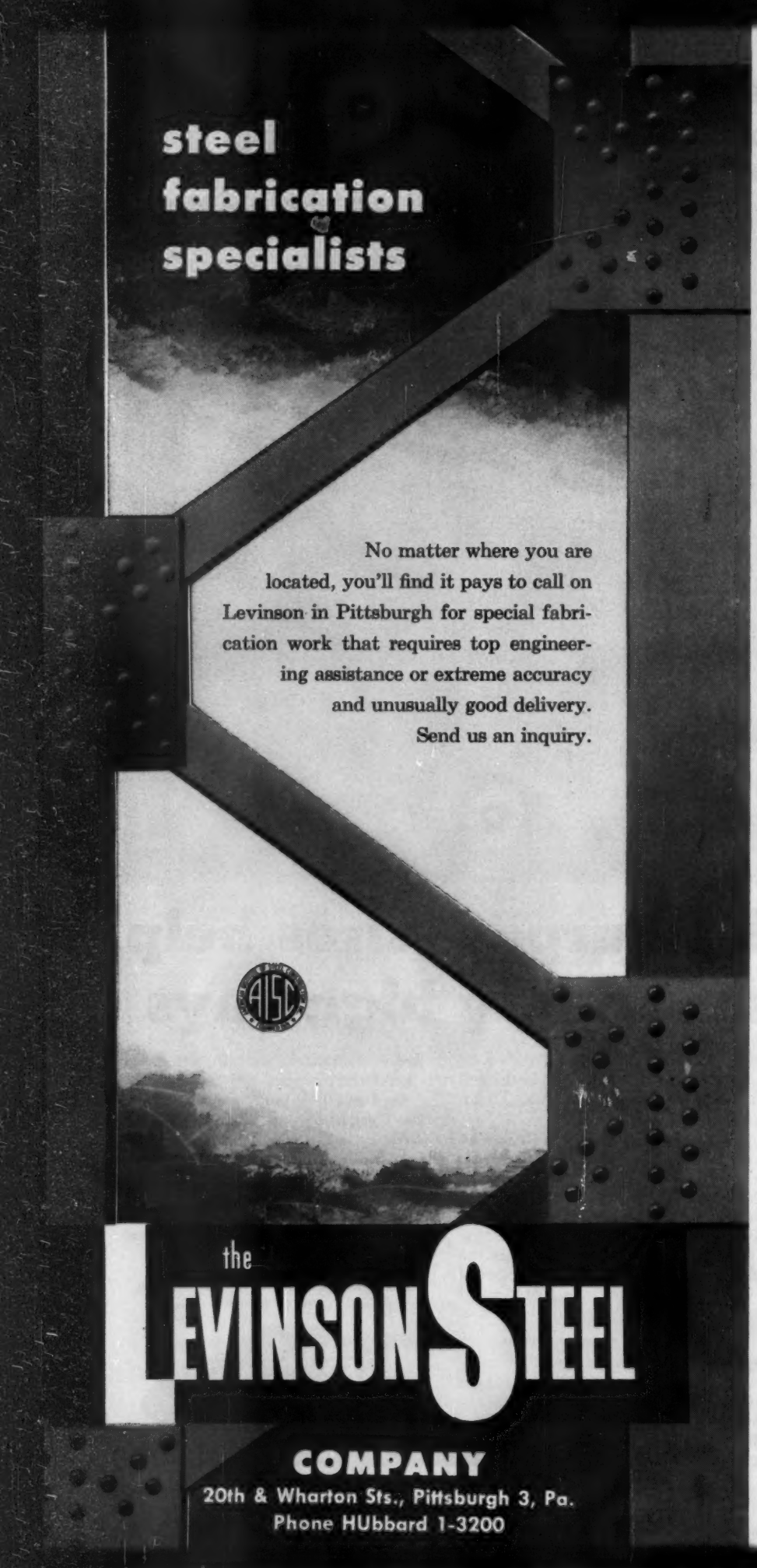
The result could be a high rate of tire mortality if the county didn't use new B. F. Goodrich *all-nylon* All-Purpose tires. This is the tire that's built upside down to resist rock bruises far better than ordinary tires. Instead of having breakers just on top of the plies, the All-Purpose in addition has special breakers between the *bottom* plies to guard against bruises that start inside the tire.

All-Nylon Construction

B. F. Goodrich builds the All-Purpose with an *all-nylon* body. Nylon is stronger than ordinary cord materials, can withstand double the impact. This B. F. Goodrich tire outwears even its extra-thick tread—as much as 67% deeper than that of a regular tire—and can still be recapped over and over!

Find out how much more mileage you'll get, how much money you'll save, with B. F. Goodrich *all-nylon* All-Purpose tires (also in rayon at lower prices). Your B. F. Goodrich retailer is listed under Tires in the Yellow Pages of your phone book. Or write *The B. F. Goodrich Co., Tire & Equipment Division, Akron 18, Ohio.*

Specify B. F. Goodrich tires when ordering new equipment!



READER COMMENT

Atomic Power Problems

SIR: Rarely has the engineering profession been so stirred in all its branches as now when anticipating forthcoming developments in the atomic energy field. Committees and conferences of varying weight are being set up right and left. On scrutinizing their composition, one is impressed with the general failure to include dissident points of view.

Unless this drift can be corrected, the engineering profession may be in for an experience comparable to that which a quarter of a century or more ago accompanied the espousal by the leadership of the larger engineering groups of the fallacious reproductions-cost-new theory of valuation. And this was no trifling matter. This erroneous concept added many hundreds of millions to alleged plant values—especially of electrical utilities. And it took away in inflated rates tens of millions from those least able to pay. It is impossible to estimate the drop in public esteem which the engineering profession suffered when the opposing theory of prudent investment valuations became the uncontested law of the land.

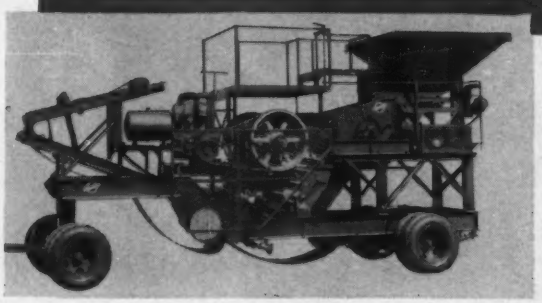
No one can foretell all the clashing viewpoints that will develop between public and private interests, or between various private interests, as the dream of atomic energy unfolds. The recent Congressional debates on the Atomic Energy Act of 1954 pinpointed some of the conflicts, but the final act did not seem to settle any major question. Neither the public nor private spokesmen were satisfied with either the patent provisions or the electric-power provisions. A large private segment is not satisfied with the basic provision that all fissionable materials shall be federally owned. Some still want and will seek the right of private ownership of fuel materials, although they are capable of conversion to weapons use.

The proponents of public power development are dissatisfied that no federal agency was authorized and directed to construct reactors for generation of electricity. Some of them believe, on the basis of General Electric Company estimates, that reactors can now produce economic electricity for use in high-power-cost areas of the United States if publicly financed, but that these plants are being withheld because private inter-

(*Continued on page 8*)

FOR PRODUCING *LOW COST* ROAD BUILDING AGGREGATE

TELSMITH *SINGLE PASS*
Scalping and Crushing Plant



The Town of Brasher, New York, gets about 60 cubic yards per hour from its Telsmith 1424 Single Pass Portable Scalping and Crushing Plant. Plant feed is about 50% sand, 50% gravel, with a large percentage to be crushed. The low cost aggregate produced is used as base fill on township roads. Highly mobile, this plant is easily and quickly moved from pit to pit. Nothing to remove; traveling height is low. Just unfold hinge conveyor, lower support jacks, start the engine—you're in production. Four sizes: 1021 to 1036. Get Bulletin 288.

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- Large 1¾ cubic yard receiving hopper—6′ x 6′-4″ opening with removable bar grizzly.
- Heavy-Duty Reciprocating Plate Feeder with adjustable stroke, roller bearings and Twin Disc controlled from both ground and operator's platform.
- Telsmith Heavy-Duty Scalping Screen with four roller bearings.
- Telsmith Heavy-Duty Roller Bearing Jaw Crusher has CAST STEEL FRAME—long jaw dies for low percentage of oversize.
- Operator's platform with removable guard rail located near hopper, screen and crusher.
- Folding Type Belt Conveyor with highly efficient wrap drive, self-cleaning pulleys and three-point belt take-up.
- Entire transmission equipment has double-row, self-aligning roller bearings, perfectly sealed—bearings adjustable for wear, all sprockets have hardened cut teeth and all chains are roller type. All drives protected with guards.
- Brakes—manual or air operated—can be furnished at additional cost.

P-20

SMITH ENGINEERING WORKS

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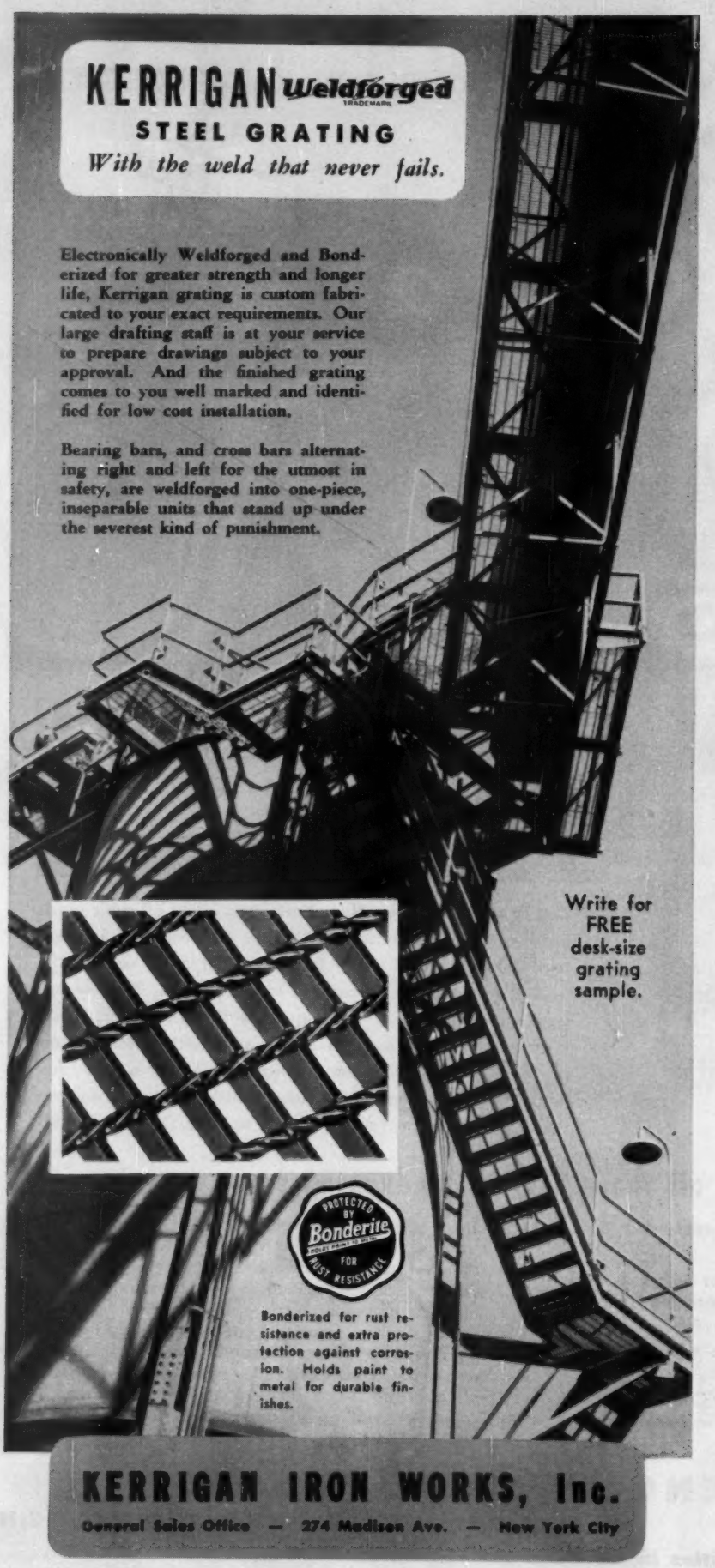
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READER COMMENT

ests are not yet ready to introduce atomic energy. They feel that government yardstick developments are necessary, both as a measure of cost and as a measure of feasibility.

Virtually all of the basic policy questions remain open. For instance: Should the government retain title and control over all of the basic fissionable material? Should these materials, brought to usefulness by government research and development programs costing billions, be regarded as a part of the public domain, and so administered? Should licenses for the use of public fissionable material to generate electric power contain the same sort of safeguards as those thrown around hydro-electric resources, such as right to recapture, non-capitalization of license values, rates based on prudent investment?

If fissionable material is not to be treated as public property, what consideration should be given by private interests to the expenditure of billions of dollars by the government for the development of the basic art before private interests entered the field? Should right to patent be delayed until all citizens have an equal opportunity to learn the new art and enter the field? Should energy producers and merchants other than electric power companies have equal opportunity to acquire know-how in the atomic energy field before patenting is permitted? Should exclusive-right patents ever be issued, or should patents be subject permanently to mandatory licensing? How should fees for use of patents be set? What consideration should be given in establishment of royalties to the great basic public discoveries?

How should monopoly be controlled or prevented? Should past serious anti-trust law offenders be entrusted with exclusive patents? Should there be limitations on the extent of control over our society which one or a small group of private interests might exercise? For example, should a private monopoly be permitted to control, by patent, the use of fissionable materials to produce energy, determining what companies, cities or areas might get plants? Should there be regulation of use or non-use of new inventions and discoveries (1) to prevent withholding of useful new developments, and (2) to regulate the introduction into our society of new discoveries which might otherwise drastically and suddenly disrupt established industrial and employment patterns?

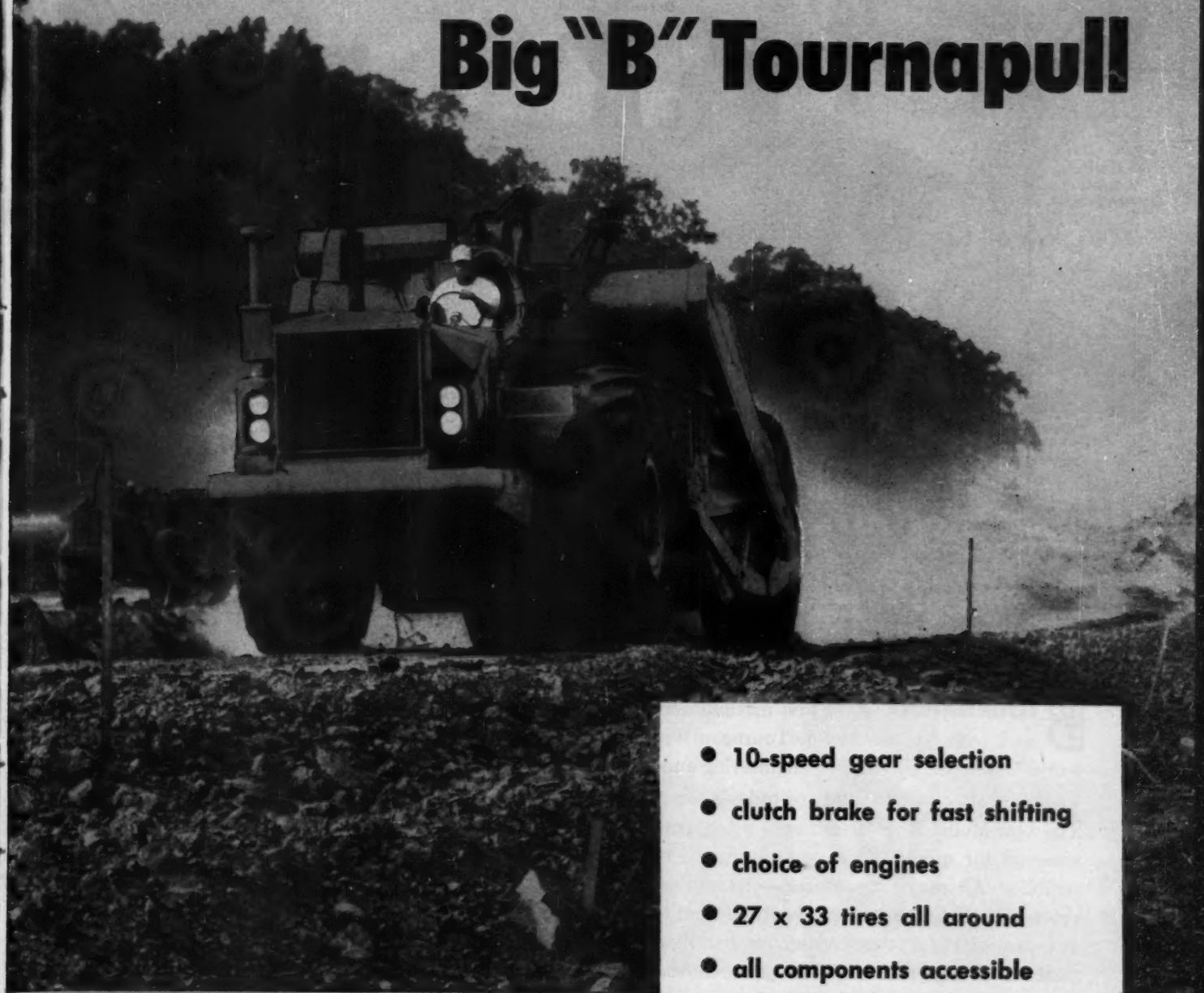
The task of locating dissident and

(*Continued on page 13*)

NEW

18 yds. struck
23 yds. heaped
without sideboards

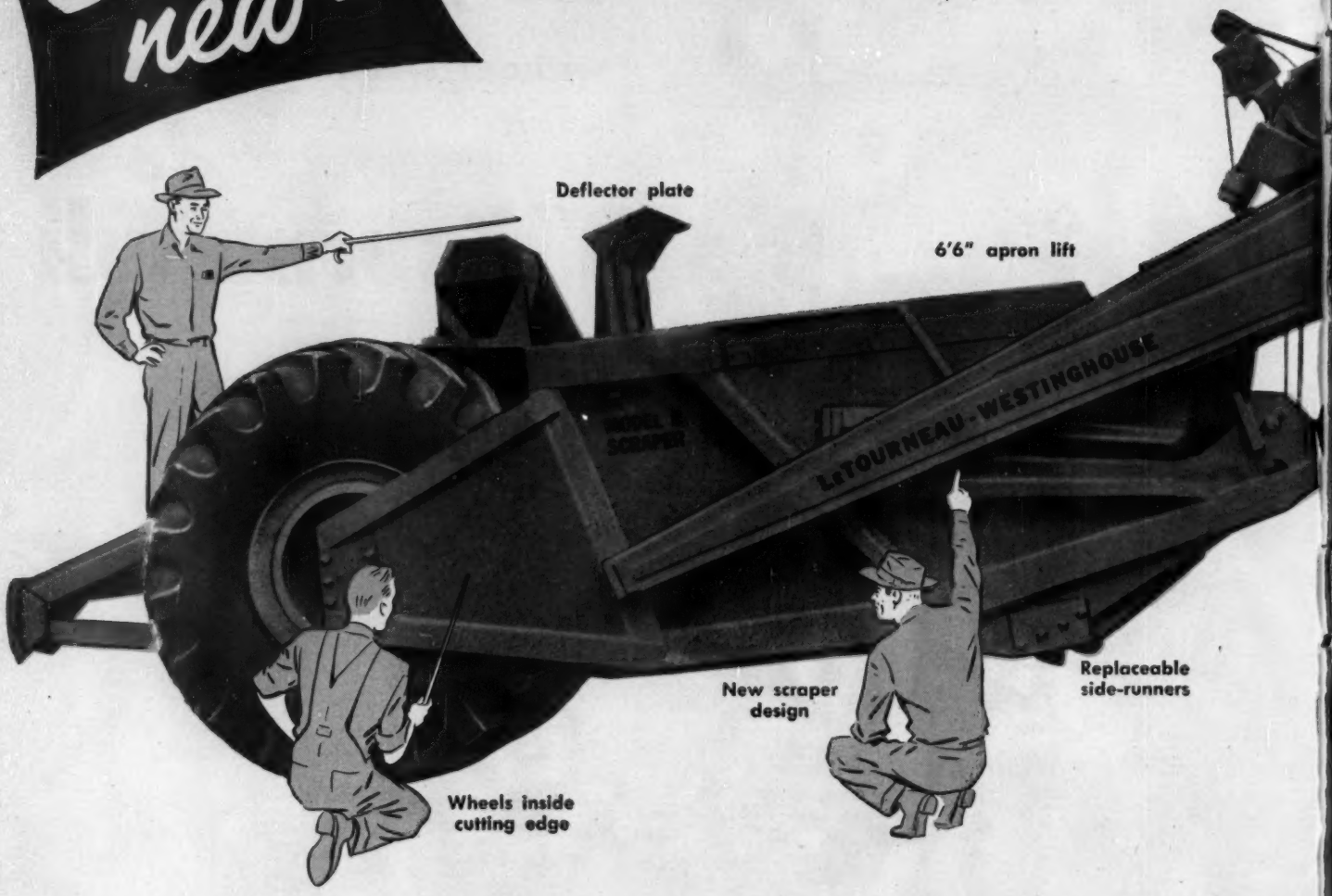
Big "B" Tournapull!



- 10-speed gear selection
- clutch brake for fast shifting
- choice of engines
- 27 x 33 tires all around
- all components accessible
- "feather-touch" power steer

See following pages for details on this big new scraper

Brand new — from the ground up...the

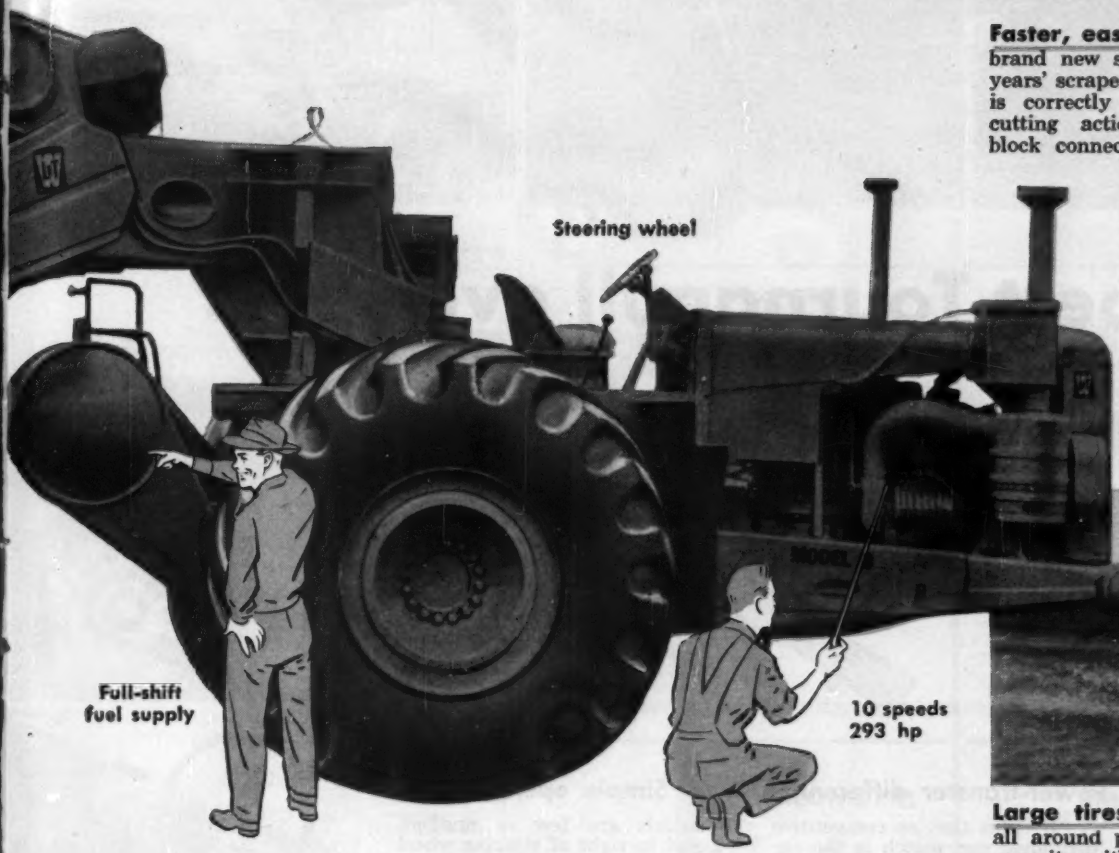


B TOURNAPULL is the first machine completely designed and built by the new LeTourneau-Westinghouse Company. Developed by our new engineering and research staff, it was built after careful study of today's scraper requirements. The *new* Model B prime-mover is a big, powerful tractor engineered for quick and easy replacement of component assemblies. All major assemblies — transmission, clutch, final drive, differential, etc. — can be lifted from the machine without necessity for time-consuming handling of other components. Every part of both prime-mover and scraper is engineered with a "plus" safety factor to give you the most rugged scraper unit ever built. Prototypes of the "B" were put through rugged tests on our new proving grounds. They were then tested on-the-job by leading contractors in all types of materials under rugged field conditions. The new LeTourneau-Westinghouse Company has carefully and thoroughly designed, tested and job-proved this new "B" Tournapull before putting it into production.

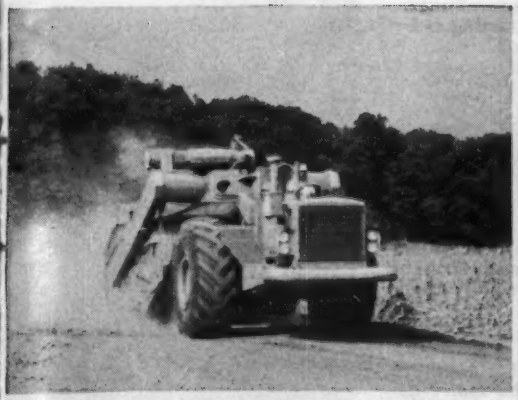
Biggest single-engine self-propelled scraper on the market. "B" packs in 18 cu. yds., struck, or 23 cu. yds. heaped, *without sideboards.* New scraper design makes for easy loading. Proper weight distribution that puts 56% of loaded scraper weight on drive wheels, plus 293 hp of diesel power, help get heaped loads in a hurry. You have a choice of Cummins or GM engines for standardization with other equipment in your fleet.

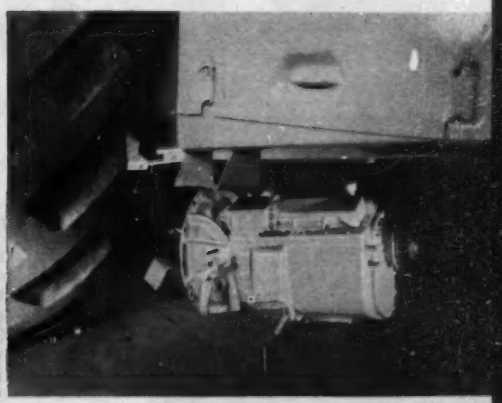
new 23-yd. B Tournapull

Faster, easier loading is a feature of brand new scraper design based on 36 years' scraper building experience. Blade is correctly angled for most efficient cutting action. Newly-designed push-block connects with scraper bottom as well as side sheets. This gives direct action to utilize full power of push-tractor for faster easier loading. Deflector plate at rear of bowl and curved apron provides easy boiling action. Scraper wheels track inside cutting edge. Apron lifts 6'6" to permit free ejection of any material. Cables are short. Welded box-beam construction increases strength, lowers deadweight.



Large tires (27.00 x 33, 30 ply) used all around provide ample load-carrying capacity without overloading. Tires and wheels are interchangeable between prime-mover and scraper. One spare serves your entire fleet.





Ten gear ratios allow you to select working speed best suited to underfoot conditions. Low gear matches pusher speed, enables "B" to help itself in loading . . . gives full lugging power for pulling through soft going. Clutch brake permits fast shifting without gear clashing. No double-clutching is necessary. This combination of 10 speeds, plus clutch brake for fast shifting, means hauling at higher speeds . . . more trips per hour.

Instant-response, positive electric controls are simpler and trouble-free. New feather-touch power-steer gives you feel of the road. Tailgate and apron are controlled by a single control switch. Tailgate moves forward automatically as soon as apron reaches full raised position. All electric motors, including steering motor, are in the open for easy adjustment when necessary. Electric controls enable operators to do better work all day long.

Easy accessibility of all components facilitate quick servicing and repair. Disassembly is easy. For instance, you can drop transmission in less than an hour without pulling engine. Bolt sizes are held to a minimum. Quick disconnects are used wherever possible. Drain and fill plugs are easily accessible. Number of lube points and types of lubricants are reduced to lowest practical limits. Large fuel tank with ten-hour supply is provided.

This B Tournapull was tested on a road job near Momence, Illinois. Unit was later shifted to a section on Indiana Turnpike. All test models were given punishing treatment so trouble spots would show up for correction.

"B" shown here hauled sand and tough lower-magnesium limestone on highway work at Hager City, Wisconsin. Big 4-wheel air brakes (7536 sq. in. total brake surface) and power steer provide ample safety margin.

Another new "B" prime-mover gets additional testing on installation in West Virginia. Its 35-ton Rear-Dump trailing unit is interchangeable with the 23-yd. Scraper described on this and preceding pages.

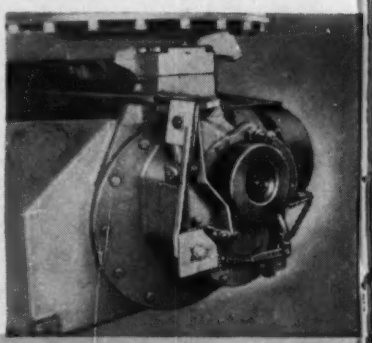
The best Tournapull ever built

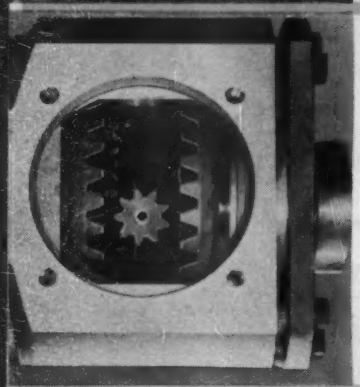
90° turns

Despite its size, the "B" machine can turn around non-stop in space 35′ wide. Its 90° maneuverability will pay off in narrow cuts and fills.

Positive parking brake

Simple brake on output shaft of transfer case gives you safe, sure parking. Brake is mounted out in open for quick adjustment. Parts are few.





Power-transter differential

A "B" plus that no competitive dirtmover can match is the exclusive power-transfer differential. Unit automatically keeps power flow equal and constant to both drive wheels . . . prevents spin of wheel on poor footing. "B" keeps going through soft fills and soggy cuts where other machines hang up.

Simple operation

Controls are few in number. Lever to right of steering wheel raises and lowers bowl. Single pushbutton control synchronizes apron and tailgate action. Other levers are shift lever, transfer case lever, and hand throttle. Floor pedals operate accelerator, clutch, and brake. Starting is by dashboard pushbutton.

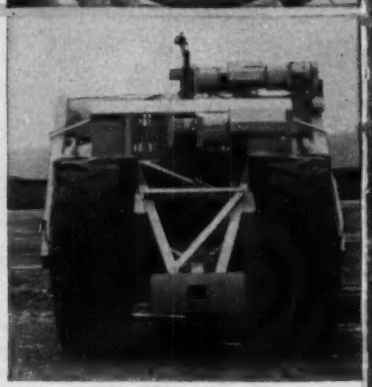
Instant bowl drop

Quick-release allows gravity drop of bowl, but retains efficient electric controls for hoisting. This enables you to "pump" loads . . . work effectively in sand and other loose materials . . . keep material boiling for big loads. Precision control by electricity lets you adjust bowl height within fraction of inch for accurate loading, spreading.

Better pusher contact

Push-block is low to direct push-tractor's thrust efficiently straight to blade. Block is rigidly reinforced.

Details shown on this page are only a portion of the many design features you'll find in this "new from the ground up" prime-mover and scraper.



Tournapull—Trademark Reg. U.S. Pat. Off. BP-767-G

Find out all about B Tournapull. See it work. Analyze its speed and production possibilities. Study the flotation and maneuverability of this new machine. Compare price per yard of capacity. Before you buy be sure you check *all* details on the new LeTourneau-Westinghouse B Tournapull. It's available now!

LeTourneau-Westinghouse Company

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READER COMMENT

dependable points of view is admittedly not an easy one. But unless it can be reasonably met we will again run the risk of arraying the engineering profession against easily recognized public interests. At this stage of the world's social development any distinction for the engineer worth having—individually or collectively—must lie in a proper regard for public interests.

This fact should not be overlooked in selecting speakers for the Nuclear Congress now being planned by Engineers Joint Council for the fall of 1955.

MORRIS LLEWELLYN COOKE
Consulting Engineer,
Philadelphia, Pa.

Associates

SIR: In the Dec. 9 issue, we note on page 26 a statement as to two buildings in which we are involved.

The one at 425 Park Avenue is correctly stated but that for Seagram's is inaccurate.

The Architects for Seagram's are Mies Van Der Rohe and Philip Johnson, with Kahn and Jacobs as Associate Architects.

ELY JACQUES KAHN
Kahn & Jacobs, Architects
New York

CALENDAR

Associated Equipment Distributors, annual meeting, Conrad Hilton Hotel, Chicago, Jan. 23-27.

Mason Contractors Association of America, annual convention, Jefferson Hotel, St. Louis, Jan. 30-Feb. 2.

Seventh California Street & Highway Conference, Institute of Transportation and Traffic Engineering, University of California, Berkeley, Calif., Feb. 2-4.

Association of Asphalt Paving Technologists, annual meeting, Jung Hotel, New Orleans, La., Feb. 7-9.

American Society of Civil Engineers, convention, U. S. Grant Hotel, San Diego, Calif., Feb. 7-12.

National Society of Professional Engineers, spring meeting, Hotel Charlotte, Charlotte, N. C., Feb. 18-19.

American Concrete Institute, annual convention, Hotel Schroeder, Milwaukee, Wis., Feb. 21-24.

Annual Highway Engineering Conference of the University of Colorado, Boulder, Feb. 24-25.

Concrete Contractor's Association of Greater Chicago, Mid-West Concrete Exposition, Navy Pier, Chicago, Feb. 24-26.

Association of Highway Officials of the North Atlantic States, annual convention, Hotel Traymore, Atlantic City, N. J., March 2-4.

National Association of Corrosion Engineers, annual conference, Palmer House, Chicago, March 7-11.

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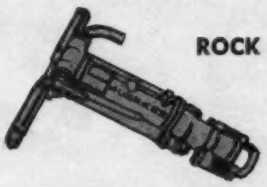
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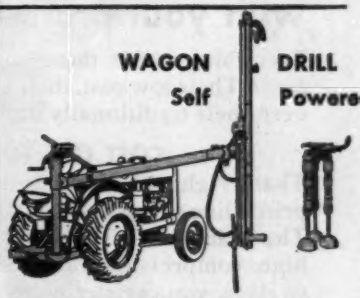
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CHEVROLET

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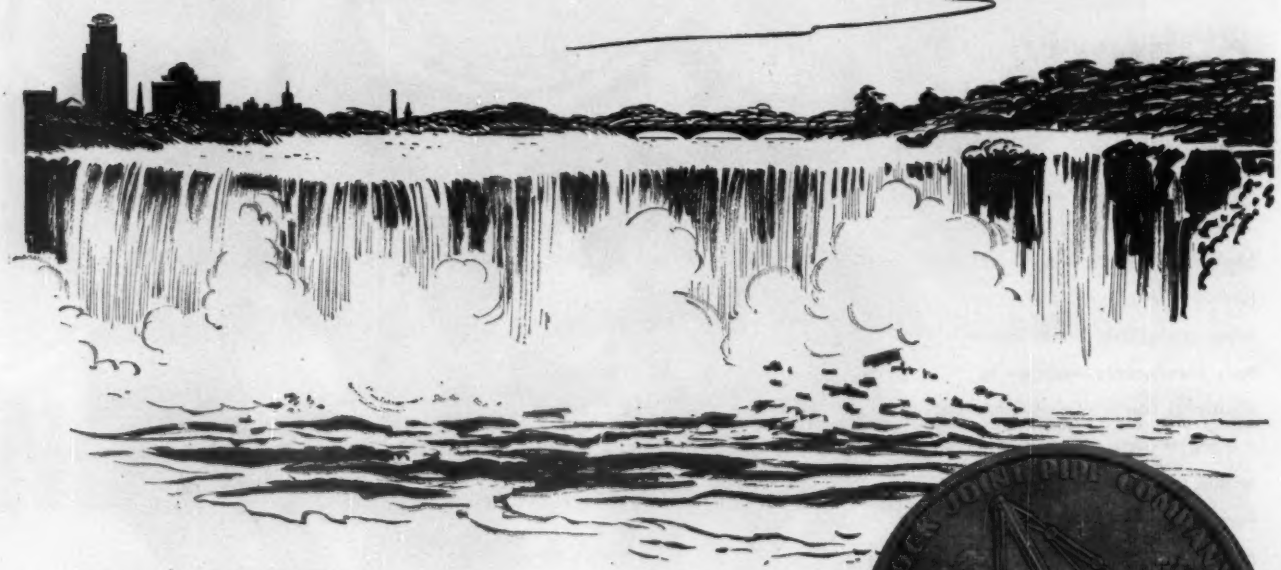
580 times more water than flows over Niagara Falls!



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This is the measure of the tremendous contribution Lock Joint Pipe has made, over the past half century, toward meeting one of civilization's most serious problems — water supply.

You may be sure that every resource of skill, experience and research at our command is at this very moment working on the answers to the even greater problems we must meet in the *next* 50 years!

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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

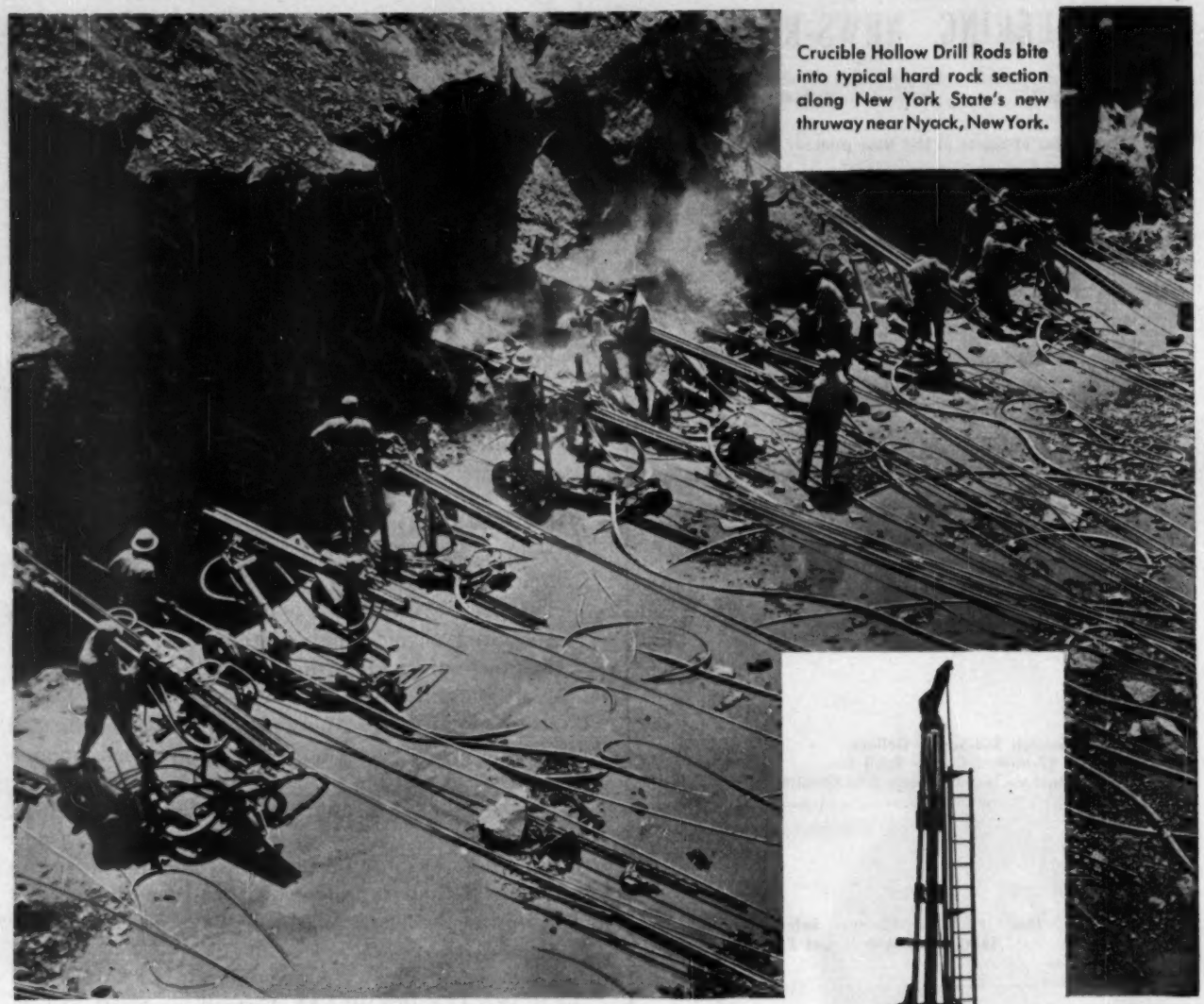
ENGINEER LICENSING—Despite influential opposition, members of the New York State Society of Professional Engineers have voted to push amendments to the state's engineer licensing law this year (ENR Dec 23, 1954, p. 11). The vote favors amendments to allow engineering practice by corporations other than those practicing since 1935 under a grandfather clause. However, amendments would require registration of any engineering corporation desiring to practice, plus licensing as professional engineers its entire board of directors and all other employes designated as engineers.

HERE WE GO AGAIN—The Incodel Plan, a four-state, $500-million Delaware River water supply scheme, was declared dead a year ago. And, just last week ENR carried a discussion (page 35) by a consulting engineer and an attorney for Pennsylvania, pointing out why they think it is better off dead. But, now comes a report that Pennsylvania's new Democratic Gov. George M. Leader will have the Incodel Plan re-appraised. Conflicting professional opinion on the proposed interstate accord vs existing U.S. Supreme Court jurisdiction isn't likely to change. However, with New York State and New Jersey now also under Democratic administrations and the fourth state, Delaware, a willing partner from the start, it looks like this hardy perennial issue is due for another round.

ELIGIBILITY PROBLEM—Virtually no North Dakota contractor has a chance of serving in his state legislature, unless the current session amends a law that bars persons doing $10,000 or more business with the state or any of its subdivisions. One of three contractors now holding seats has challenged the measure unsuccessfully up to the State Supreme Court.

WINDFALL REFUNDS—Uncle Sam stands a chance of getting back at least part of the windfall profits reaped under the Section 608 postwar apartment building program. An FHA official last week told a House Appropriations Subcommittee that tentative settlements had been made with four builders for refunds totaling $1 million. He expressed confidence that FHA would be able to recapture a fair sum, if it moves fast enough.

SIDE ISSUE—When asking for bids on a five-mile stretch of toll road near the towns of Charlton and Sturbridge in central Massachusetts, the state's turnpike authority asked that the contractor alert his men to watch for Indian relics. The route cuts across the battleground of the 1665 Podunk Indian war against King Philip.



Crucible Hollow Drill Rods bite into typical hard rock section along New York State's new thruway near Nyack, New York.

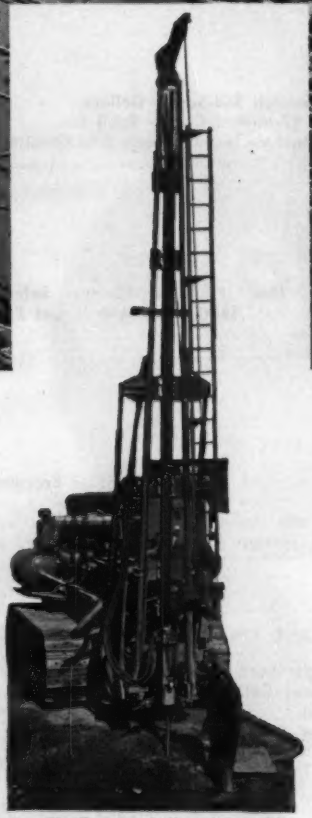
CRUCIBLE HOLLOW DRILL RODS

on the firing line —New York State Thruway

Chewing through hard rock sections of the New York Thruway, Crucible Hollow Drill Rods are helping to build this modern, high-speed highway across the state.

To make this motorist's dream come true meant careful planning by highway engineers—cooperation of dozens of contractors—top quality equipment. That's why large quantities of Crucible Hollow Drill Rods are being used. For experienced construction men *know* they can always depend upon Crucible Hollow Drill Rods for uniformly high performance in the field.

Crucible makes its hollow drill rods to *tool steel standards.* And that means *extra* quality . . . fewer broken rods and lost bits . . . *lowest cost per foot of hole drilled.* Make all *your* drilling jobs go smoothly—specify Crucible Hollow Drill Rods. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*



Joy Challenger drill and Crucible Hollow Drill Rod at work on New York State Thruway, Arden, N.Y.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

WASHINGTON OBSERVER

Eisenhower's construction program is based on the long haul. He believes there's a real need for the federal government to do its share to keep the country's prosperity and employment up to its potential.

That's behind his new plans for stepped up spending on such things as highways, schools, urban redevelopment, flood control and reclamation starts (see pages 21, 22). There's more local participation, and other changes in procedure—but it adds up to a really big public works program.

Of course, there's good short-term politics in all this, too. Whether or not Eisenhower himself runs for his second term next year, he will have built a legislative program for the GOP to take to the voters.

•

There's no doubt that Eisenhower has turned the corner on spending. He is not talking up budget-balancing as one of the big objects in the years just ahead. Instead he talks about the growth of the country making it possible to finance projects that wouldn't otherwise be feasible. At the same time, he's holding off any tax cuts—saving them for such time as the economy might need a tax cut jolt.

•

There's grumbling from both Republicans and Democrats about those budget proposals that translate the Eisenhower middle-of-the-road program into dollars and cents.

Right-wing Republicans say that Eisenhower is too "New Dealish" but the realists among them know the party needs Ike when it goes to the polls next year. They can't repudiate him.

Democrats complain that he's lifted pages right out of their book. They know that his public works program is going to be hard for them to vote against. So they'll be forced to talk against the way Eisenhower does things.

•

The Democrats are ready to hit public power and federal works policies that Eisenhower is trying to put across. These challenges to the Administration will rank in importance with the debate over the new highway financing scheme of the Clay committee (see page 23).

•

The Dixon-Yates controversy will be a major target. Local "partnership" programs of dam building and electricity transmission will be gone over, too.

A pro-public power group is being organized in the powerful House Appropriations Committee to take on the Administration. Chairman Clarence Cannon of Missouri has set up a new subcommittee, called the Subcommittee on Public Works, to pass on the money requests of the major agencies dealing in federal construction. Under the new group will be: Corps of Engineers rivers and harbors projects, Atomic Energy Commission, Bureau of Reclamation, Bonneville Power Administration, Southeast Power Administration, Southwest Power Administration, and the Tennessee Valley Authority.

The nine Democrats appointed to this committee are predominantly pro-public power. The six Republicans who will go on it will be easily outvoted.

Money to AEC to buy the private Dixon-Yates steam plant can be cut off, right there. The same threat holds against federal contributions to some of the local power projects like Priest Rapids, etc.

This lineup assures a hard fight—which will mean delay in most of the appropriations legislation that the construction industry follows.

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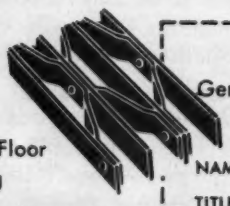

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In the 1956 Budget:

Construction Funds Add Up to $5 Billion

President Eisenhower in his budget message to Congress this week called for a federal program in the fiscal year beginning next July 1 amounting to $5 billion—just a shade under the current level.

But this year, as never before, the budget figures fail to tell the whole story of government construction plans. Not included in the budget is the President's plan for doubling the rate of highway construction which he will present to Congress later this month.

Another omission is the Administration program for providing federal aid for school construction, slated to be the subject of a special message to Congress Feb. 15.

In addition, the Administration is planning for a substantial expansion of construction of government buildings under lease-purchase, of water and power projects in partnership with local interests and of urban renewal work—all at relatively low cost to the federal government.

Actually, there is more money than last year in the 1956 budget for almost every major construction agency of the federal government—with two important exceptions. The Tennessee Valley Authority gets only $79.9 million for 1956 as compared with $281.7 last year, and the Atomic Energy Commission gets $431 million compared with $823.3 last year (see table page 22).

But the Corps of Engineers, the Bureau of Reclamation, the Housing and Home Finance Agency and all three military services still have more money to spend in 1956 than they had in 1955—if Congress follows the recommendations of the President.

• **New starts**—President Eisenhower asked Congress to provide money to start 39 Army Engineer and reclamation projects that already have been authorized. In addition, he asked both authorization and cash for his two favored multi-purpose projects—upper Colorado and Fryingpan Arkansas. The President asked modest starting sums of $5 million for the $1-billion Upper Colorado development and $2 million for the $175-million Fryingpan project (see table page 26).

Among the previously authorized projects President Eisenhower recommended for starting, the largest is the $80-million job of widening the Calumet-Sag waterway in Illinois. Next biggest is the $77-million deepening of the Delaware River between Philadelphia and Trenton.

The "Sag" would get $4 million to start; the Delaware, $7 million—but only after U. S. Steel agrees to pay a share of the cost of a deeper channel for ore boats.

Of the other new starts requested, the most important is an urgent $47-million project to prevent the Mississippi River from changing its lower course completely, diverting its flow to the Atchafalaya River. Another is Eagle Gorge reservoir in the state of Washington, a $20-million flood control project that involves large local contributions.

Among presently authorized reclamation projects recommended for starting, the biggest is Santa Maria in California, estimated to cost about $17 million. Most other projects on the new starts list are considerably smaller.

Proposed partnership projects are more substantial. The President said he will ask Congress to appropriate money for the Army Engineers and the Reclamation Bureau—$10 million for each agency—to pay federal costs on cooperative projects like the three already in the works.

He expects local interests to install the power facilities at Cougar and Green Peter Dams in Oregon and to build the Rocky Reach project to Washington. The Corps of Engineers would construct the two Oregon dams and would pay the federal share of Rocky Reach costs to the developers of the site.

Investigations and planning for future projects would receive more money under the budget requests than they got this year. A total of $45 million is recommended for general basic data collection and $10 million for preliminary studies of river basin and other construction programs. Passamaquoddy Bay would be restudied as a potential power site under proposed legislation that will request $1 million for the work.

Advance preparation of construction plans would get a total of $13 million, of which $7 million would go for the design of high-priority projects by the Army Engineers and the Reclamation Bureau. The budget also requests $8.5 million for the Housing and Home Finance Agency to make public works planning advances to state and local governments.

• **Backlog is substantial**—At the start of the next fiscal year, July 1, federal agencies will have plans completed for $1 billion of authorized projects and advance planning in various stages of completion for an additional $3.4 billion.

A year later they expect to build up these totals to $1.9 billion and $3.7 billion. By that time, July 1, 1956, the Corps of Engineers will have plans completed for more than $850 million of work and in process for $2.2 billion. Reclamation will have complete plans for $300 million and planning under way for $900 million.

The total backlog of authorized federal projects amounts to $10.5 billion on the basis of present costs. Of this total, about $8 billion is in river basin programs of the Army Engineers and the Reclamation Bureau, which account for $5.9 billion and $2.1 billion, respectively.

In addition, these two agencies have programs and projects under construction with a total estimated cost of nearly $10 billion, of which more than $3.3 billion will remain to be completed after 1956.

As expected, no federal funds were requested in the budget message for the President's program to double the rate of highway construction. Financing of the federal share of the expanded program is to be assigned to a new independent federal corporation outside the budget. Federal highway aid to the states, however, goes up nearly $80 million above this year's figure to about $670 million.

Likewise, no school aid funds were asked by the President to carry out the "affirmative program" for more classrooms that he has promised. This omission makes it likely that the Eisenhower plan for assisting local governments to build more schools will not include any direct federal loans or grants.

Grants for school construction in

. . . Budget

federally affected areas are scheduled to drop to $94 million in 1956 from $134 million this year.

But federal-aid grants for airport construction are expected to go up by more than $5 million—from about $14 million in the current fiscal year to $19.5 million in 1956.

Construction expenditures on the St. Lawrence Seaway also will increase in fiscal 1956. The St. Lawrence Seaway Development Corp. is spending $6 million this year. Next year it will spend nearly $22 million.

Grants for local hospital construction are slated to rise from $44 million this year to $55 million in 1956, of which $45 million will go to private nonprofit institutions. This program was expanded last year to include nursing homes, diagnostic centers and other facilities for the chronically ill.

Among new federal projects to be started in 1956 are three Veterans Administration hospitals—the long-awaited 1,000-bed hospitals at Cleveland and San Francisco and a 680-bed addition at Long Beach, Calif. Construction expenditures by VA will go up to $56 million from $40 million this year.

Other new projects to be started during 1956 include a $23-million building in Maryland for the Bureau of Old Age and Survivors Insurance; a $6.5-million medical research center containing a nuclear reactor at Brookhaven, N. Y., by the Atomic Energy Commission; and a new post office and courthouse at Nome, Alaska.

Planning and sites for lease-purchase buildings (to be built by private investors for federal occupancy) will require expenditures by the General Services Administration of about $3 million in 1956. Included will be $275,000 to complete the $350,000 planning job for a Geological Survey building.

Loans for the low-rent public housing in the year are expected to total nearly $500 million. About as much will be returned to the government in repayment of old loans. The 1956 budget provides for starting 35,000 units.

To assure no holdup in urban renewal grants to cities and towns, Eisenhower will ask Congress for $500 million of additional capital grant authority—$100 million for the current year and $200 million for each of the next two years.

• **Higher military construction**—Military public works expenditures of all three services will rise in 1956. Air Force spending will show the greatest increase, going up $170 million above the current year to more than $1 billion. In all, construction outlays by the Defense Department will amount to nearly $1.8 billion, an increase of $350 million over fiscal 1955.

Air Force construction in 1956 will expand the aircraft control and warning system and will build additional continental air defense bases. The Navy will further develop airfields for training and for jet aircraft and will construct shore facilities to serve the big aircraft carriers now being built. Army work will concentrate on completion of Nike facilities and new overseas troop bases.

Atomic energy construction spending tapers off to $430 million in 1956. Most of it will go into projects under construction, but new AEC projects proposed for next year include several prototype or developmental reactors and additional weapons storage facilities.

More Pulp Mills

MacMillan & Bloedel, Ltd., are planning two pulp mills on Vancouver Island. Total cost of the expansion will be $30 million. One mill will be for the production of newsprint and the other for kraft and containerboard.

H. A. Simons & Associates, of Vancouver, are going ahead with design work for the new facilities.

Construction Funds in 1956 Budget

Agency	1954 Actual	1955 Estimate	1956 Estimate
	(Fiscal years. In millions)		
CIVIL WORKS			
Corps of Engineers	$399.8	$361.6	$397.0
Tennessee Valley Authority	299.3	281.7	79.9
Department of the Interior:			
Bureau of Reclamation	163.3	132.4	152.3
Bonneville Power Administration	41.7	36.1	32.0
Office of Territories	29.3	42.9	30.4
Other Interior	39.5	49.7	58.8
Saint Lawrence Seaway Development Corporation	....	6.0	21.6
Bureau of Public Roads	559.3	630.5	699.1
Housing and Home Finance Agency:			
Low-rent public housing:			
Loans	525.6	454.2	482.6
Defense housing and other (net)	30.8	8.9	3.4
Department of Health, Education, and Welfare	179.7	201.5	162.8
Veterans Administration	54.3	40.0	56.3
Department of Agriculture	70.4	65.7	42.4
National Advisory Committee for Aeronautics	39.7	21.0	16.0
Civil Aeronautics Administration	17.5	14.2	19.5
Department of State	11.8	5.9	7.3
Treasury Department (gross)	6.8	25.5	1.0
General Services Administration	9.7	21.8	24.6
Grants for private non-profit hospital construction	40.5	36.1	45.0
Rural Electrification Administration loans (gross)	210.0	210.0	210.0
College housing loans (gross)	34.9	40.8	28.2
Other	62.0	97.2	131.6
Total, civil public works	**2,825.9**	**2,785.7**	**2,711.8**
DEFENSE CONSTRUCTION			
Air Force	$1,711.7	$1,429.5	$1,782.3
Army	379.9	321.0	381.0
Navy	373.1	238.3	265.0
Interservice activities	....	13.0	13.0
Proposed legislation, Defense Dept.	....	....	95.0
Atomic Energy Commission	1,085.3	832.3	431.0
Proposed legislation, AEC	....	....	80.0
General Services Administration:			
Storage facilities	6.3	1.1	....
Total, defense construction	**2,803.3**	**2,262.9**	**2,293.3**
Total, federal construction	**5,629.2**	**5,048.6**	**5,005.1**

Highway Plan Draws Both Cheers, Criticism

The recommendations of President Eisenhower's special committee on highways won broad approval in Congress, among federal and state highway officials and in highway user groups this week. But there were barbed criticisms of specific details of the program.

The committee, under Gen. Lucius Clay, outlined ways to give concrete form to the President's suggestion that the rate of highway construction be doubled in the next 10 years. Committee recommendations are expected to form the basis of a special Presidential message to Congress on highways Jan. 27.

The committee said a total of $101 billion should be spent to bring the nation's highways up to standards for 1964 traffic, but it made specific proposals to cover only $72 billion of that total. The remaining $29 billion would come from the states.

A principal committee recommendation was that the federal government pay $25 billion of the estimated $27-billion cost of bringing the 40,000 mi interstate road system up to standard.

About $20 billion of the federal share, the committee said, should come from the sale of bonds issued by a federal highway corporation. The rest would come from federal taxes on gasoline and oil.

• **Critics in Congress**—In Congress, criticism of the committee recommendations centered principally on this scheme for financing the expanded highway building program.

Democrats led the attack, charging that the plan would create a "hidden debt" and would cost up to $1 billion more than straight budget financing. Sen. Albert Gore (D., Tenn.), the new chairman of the Public Roads Subcommittee, said, "This is a kind of financing Harry Hopkins never even dreamed of. It's a screwy plan which could lead the country into inflationary ruin."

Sen. Harry F. Byrd (D., Va.), chairman of the powerful Senate Finance Committee, was equally caustic in his criticism. He not only condemned the entire financing plan but also demanded the repeal of the current federal two-cent gasoline tax.

• **Criticism of highway officials**—Experienced highway officials attacked the Clay committee recommendations from a different angle. They centered their fire on the recommendation that decisions of the Commissioner of Public Roads should be subject to a veto by the five-man board of the federal highway corporation.

The committee said this board of directors should be composed of three citizens appointed by the President with the consent of the Senate and the Secretaries of the Treasury and of Commerce. The Secretary of Defense would sit in ex-officio when questions of highway location are considered.

The board would have the final word in determining which project should be built and in what priority on the interstate highway system. Heretofore, Commissioner of Public Roads has had full and final authority.

Highway officials believe the change suggested by the Clay committee will reduce the status of the Commissioner and will also serve as an invitation to play politics with the interstate highway program.

• **Criticism of highway users**—Highway user groups blasted the committee recommendations on still a third point. They hit at the suggestion that the federal government repay the states for construction on the interstate system that is up to standard—whether it be toll highway or free roads. Highway users charged this would amount to making their membership pay twice for the roads they use most.

The Clay committee—and the studies by the governors of the states, as well—recommended this refund to the states with a number of conditions:

• The money refunded would have to be used for other highway building.

• The state must have matched all normal federal-aid money allocated it.

• Credit for roads built between 1947 and 1951 should be limited to 40% of the costs, not including the cost of financing.

• Credit for roads completed prior to this year should be limited to 70% of the cost, not including financing costs.

• In no case should credit be given for federal funds expended on a road or for toll-road expenditures in excess of the amount remaining for amortization.

The Clay committee also made definite recommendations on a number of other aspects of the highway problem. It said:

• Federal funds should not be used for construction of off-street parking facilities or for the acquisition of land for such purposes.

• Since certain new urban arterials, not on the federal aid system, are necessary, $4 billion should be assigned for their construction during the 10-year period.

• Bonds issued by the federal highway corporation should be fully taxable.

The committee, headed by Gen. Lucius Clay, chairman of the board of Continental Can Co., also included Stephen D. Bechtel, San Francisco, president of Bechtel Corp.; David Beck, Seattle, president, International Brotherhood of Teamsters; S. Sloan Colt, New York, president, Bankers Trust Co.; and William A. Roberts, Milwaukee, president, Allis Chalmers Manufacturing Co.

THREE MEN who played leading roles in development of the highway plan get together at a White House conference. With President Eisenhower are Gov. Robert Kennon of Louisiana, who reported to the President on the plan for the Governors Conference, and Gen. Lucius Clay, who served as chairman of the President's special highway committee.

ARBA Examines Highway Plan

Road Builders' 53rd annual convention features materials exhibit; technical sessions cover wide range of problems

Discussion of President Eisenhower's "grand plan" for highways dominated the 53rd annual convention of the American Road Builders Assn. in New Orleans last week.

Louisiana's Governor Robert F. Kennon, chairman of the Governors Conference which studied the highway problem at the request of the President, keynoted the convention with the statement that even the $101-billion roadbuilding program now proposed might not be enough to provide highways fully adequate for traffic in 1964.

Gov. Kennon said the Eisenhower highway program would be of great benefit to the national economy but added that the program could, and perhaps should, amount to more than $101 billion. He recommended that all automobile taxes—an annual total of some $6 billion—should be applied exclusively to highways.

Although the highway program was the main topic both in the convention's general sessions and informal groups, other convention business also attracted attention.

This year for the first time ARBA put on a highway materials and supplies show, and it drew keen interest. The technical meetings during the four-day convention also played a more important part than they have in the past. In these meetings there were useful discussions on soils, maintenance of way, soil stabilization and materials.

The convention installed John N. Roberston, District of Columbia Director of Highways, as its new president replacing Robert M. Reindollar, Baltimore engineer consultant. Two new vice presidents also were elected: Charles W. Smith, president of Smith Engineering and Construction Co., Pensacola, Fla., for the Southern District, and George T. McCoy, chief engineer of the California Highway Department and president of the American Association of State Highway Officials, for the Western District.

The new ARBA president began with the District of Columbia Department of Highways in 1917 as a chainman in an engineering field party. In 1941 he was named Engineer of Streets, and in 1948 he became Director of Highways. Recently he launched a $125-million program of improvements for the capital.

Robertson also is president of the Association of Highway Officials of the North Atlantic States and is a member of the American Association of State Highway Officials, the Washington Society of Engineers and the Highway Research Board.

Speakers at the general sessions of the convention included Representatives J. Harry McGregor (R., Ohio); Jesse P. Wolcott (R., Mich.); George H. Fallon (D., Md.); and Senator Francis Case (R., S. D.).

Jennings Randolph, ARBA treasurer, spoke for outgoing president Reindollar, who was unable to attend because of illness. He singled out right-of-way acquisition as a major problem and recommended the creation of short university courses to give special training in proper cost evaluation with particular reference to severance damages.

Randolph also stressed the pressing need for an upward adjustment of state highway engineer salaries to boost morale, attract young engineers into the highway field and assure maximum efficiency.

Rep. McGregor cited the need to modernize a large number of state highway enabling laws, especially those controlling right-of-way acquisition. He also urged the extension of competitive bidding for highway jobs to replace force account road construction.

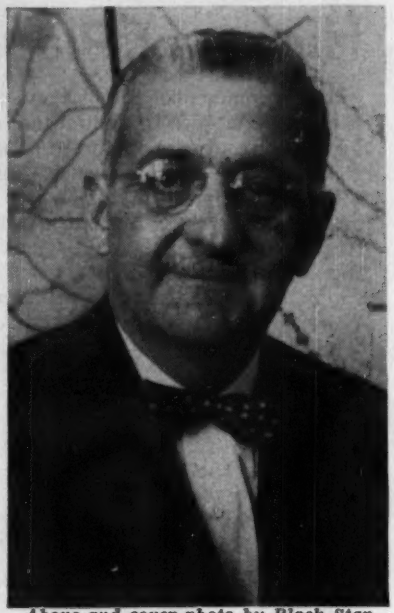
• **Highways and the national economy**—Rep. Wolcott, ranking minority member of the House Committee on Banking and Currency, said his committee had found inadequate highways a bottleneck to continued expansion of the national economy.

He said bonds issued by a federal highway agency would sell readily in the open market at rates only ⅛% higher than government bonds for long-term issues and ¼% higher for short-term issues.

Rep. Fallon stressed the importance of improved, modern highways in reducing fatal accidents, and H. E. Bailey, general manager of the Oklahoma Turnpike Authority, cited the record of the Oklahoma Turnpike to show a substantial reduction in fatal accidents.

Sen. Case warned that stepped-up construction on the interstate highway system must not delay or interfere with the building of badly needed primary, secondary and urban highways.

• **Soils session**—Two papers were presented on embankments and soils.



Above and cover photo by Black Star—Phillips

JOHN N. ROBERTSON becomes new president of ARBA.

James P. Exum, of the New York consulting engineer firm of Howard, Needles, Tammen & Bergendoff, described some unusual foundation problems on the Maine Turnpike extension.

He said in the particular marine clays near Portland neither vertical sand drains nor sheet pile cofferdams were feasible economically, but without some form of stabilization the clays could not support embankments for bridge approaches of more than 15 ft. He said the solution lay in "toe loading" the embankments with a heavy berm of soil along the shear area where foundation failure would occur first.

J. F. Tribble, assistant construction engineer of the Alabama State Highway Department, outlined techniques for building embankments across marshy areas. He discussed "floating" an embankment when muck depth is low, dredging and refilling in deeper muck and through unimproved areas, blasting under a rolling surcharge of sand, and sand drains.

• **Base Aggregates**—Base stabilization using asphalt emulsion with heated aggregates was the subject of a paper by L. C. Fitts, materials engineer of the New York Department of Public Works. At a total cost of $1.25 per sq yd, he said, two 24-ft-wide pavements on Long Island were paved with 5 in. of calcium chloride stabilized sub-base, 7 in. of bituminous stabilized base course and a 1-in. bituminous concrete wearing course.

The base course consisted of sand, gravel and loam which was passed through a dryer after blending with a

bulldozer and heated to 180 F. The amount of moisture in the material was held to 6%. Asphalt emulsion was added in a pug mill. The moisture content was such that work could proceed in inclement weather when most mixed-in-place work would have had to be suspended.

A. D. January, senior resident engineer of the Texas State Highway Department, described a soil-cement widening job on an old concrete pavement which proceeded at the rate of 2 mi a day. He said a 6-in. strip of soil cement was laid on top of an 8-in. sub-base for a total cost on the 14-in. depth of $5,410 a mile. The old 18-ft pavement then was widened to 24 ft and surfaced with a 250-lb hot asphalt mix.

C. W. McCaughey, deputy operations director of the Ohio Highway Department, told the convention that more state highway maintenance work is being done by contract every year. He reported on the methods and procedures Ohio has used in this field.

H. A. Radzikowski, Bureau of Public Roads, pointed out the advantages of maintenance by contract and said BPR has completed two years of study of the subject. He urged the delegates to send BPR any information on maintenance by contract that might come to their attention.

Mayor de Lesseps S. Morrison of New Orleans, in a welcoming address, cited the role of cities in the overall highway picture and explained New Orleans' huge Union Station plan which has revamped the whole transportation system of the city.

Consulting Engineer Sets Up Foundation To Aid Students

D. B. Steinman, well known bridge engineer, and his family have established the David B. Steinman Foundation, Inc., to help deserving students complete engineering studies or pursue full-time graduate work in engineering.

In announcing the Foundation, Dr. Steinman called it an expression of his gratitude for financial aid he received in the form of scholarships and fellowships during his college years.

The first disbursement by the Foundation was made last month to the Board of Higher Education of the City of New York. Amounting to $10,000, it will be used for loans or grants to students in the School of Technology of City College who may need financial assistance to complete their course or to undertake graduate study. According to the Board of Higher Education, the loans or grants will range from $100 to $500, with the loans being interest-free and unsecured.

School Aid Law Is Good Bet

Congress is expected to approve legislation this session providing federal aid for badly needed school construction

Congress is almost sure to vote substantial federal aid for school construction this year. That became obvious even before the congressional committees that will handle the legislation had completed their make-up.

President Eisenhower will trigger congressional action on school construction in a special message to Congress Feb. 15. But what, exactly, he will ask and what Congress will agree to are still unanswered questions.

The Administration's most budget-conscious officials favor an approach that would avoid charging the budget with federal expenditures for schools. They want the federal government to adopt a guaranteed loan technique.

Congressmen close to the issue say Congress will never buy this. They point out that many school districts already have exhausted their borrowing power and so would be unable to take advantage of this sort of federal aid. Many of these school districts, too, are in areas where the shortage of classrooms is greatest.

Some other Administration officials and a large number in Congress want the school aid program to take the form of federal grants-in-aid to the states. This would create a budget problem, but it would enable Congress to keep a finger in this politically important piece of pie.

• **Long-range or short-term?**—Another struggle shaping up in Congress, on the basis of bills so far introduced, is whether to approve a long-range program geared to provide between $10 billion and $12 billion in federal aid over a 10-year period or to settle for a short-range approach at a level of between $250 million to $500 million a year for two or three years.

The short-range approach may have the better chance because of the opposition of economy-minded congressmen to launching the government in a big new field of spending.

The President's message is expected to touch off a race between the Senate and House Labor Committees to see which can get out a bill first. The legislation is likely to be known by the name of the congressman whose bill first is approved by one of the chambers.

Sen. Lister Hill of Alabama has introduced a Senate bill with a score of co-sponsors and will get his name on the bill if the Senate acts first. There are three bills before the House Education and Labor Committee. House members expect their bill to be a committee composite, and there is a good chance it will bear the name of the chairman, Rep. Graham Barden of North Carolina.

Rep. Barden is the key to House action. He is a southern conservative and states-righter and has long opposed federal "intervention." But he supported legislation providing federal school aid to areas impacted by federal activity—defense and military.

He also is rated one of the best informed congressmen on education and is known to feel strongly the need for outside aid to the states in meeting the schoolroom shortage.

Both Rep. Barden and Rep. Samuel McConnell, ranking Republican member of the committee, are expected to support federal aid legislation.

• **Apportionment and administration**—A study made by a subcommittee last session estimated the cost of building adequate school facilities at between $10 billion and $12 billion. Rep. Carroll Kearns, Republican of Pennsylvania, chairman of this subcommittee, has introduced HR 14 which would authorize Congress to match funds that the states are willing to put up on a dollar-for-dollar basis.

This would provide no formula for apportionment and would leave administration of the program up to each state under its chief school officer.

Most House committee members are likely to try to skirt the segregation and parochial issues implicit in the question of federal aid. They feel they can bypass these thorny issues by placing the administration at the state level in the hands of the chief school officer of the state.

These issues are more apt to be raised in the Senate. Senators who support a strong civil rights program are sure to try to write in provisions calling for compliance with the Supreme Court segregation decision as a prerequisite to getting aid. But because the school shortage problem is so general, the civil righters are not likely to jeopardize the legislation with a filibuster.

Some see the business of apportioning the funds to the states as the greatest obstacle to passage of the legislation. Sen. Hill's bill calls for $500 million a year for two years, with an apportionment formula that would favor the poorer states. Congressmen from northern states are almost sure to object to this approach.

Tunnel Triumph

Bore completed on 6.4-mi Tecolote job, after fight against hot groundwater

The hottest tunnel in recent construction history—the 6.4-mi Tecolote Tunnel through the Santa Ynez Mountains of California—was holed through Jan. 15. The final blast took out an 8-ft-thick plug 1,900 ft from the outlet portal at the head of Glen Anne Canyon, 20 mi northeast of Santa Barbara.

The job was started in May 1950, but completion of the bore was delayed for months when several hundred feet of hot rock and steaming water were encountered (ENR June 17, 1954, p. 45.)

The $43.8-million circular tunnel is part of a Bureau of Reclamation project to bring water from recently completed Cachuma reservoir on the Santa Ynez River through the mountains for irrigation and domestic use in the Santa Barbara area.

The tunnel, 7 ft in dia, is capable of delivering 30,000 acre-ft of water a day at a capacity rate of 100 cfs. The water will be delivered to regulating reservoirs already constructed at Glen Anne, Lauro Ortega and Carpinteria. Forty percent of the flow will be piped into Santa Barbara's city reservoirs to meet continuing threats of water shortage in dry seasons.

Completion of the tunnel work is expected by the end of the year. This will permit delivery of the much-needed water many months earlier than had been anticipated—a five-year extension of the tunnel job was thought to be a conservative guess when crews struck hot water.

It was in the summer of 1953 that the tunnel job ran into difficulties. Nearly 4,000 gal of water a minute at a temperature of 112 deg poured out of the fractured rock. It became impossible to work in the hot and humid bore.

A million dollars worth of air-conditioning equipment was installed at the head of the tunnel in a room hollowed out in the heart of the mountain. Pumps were put in to evacuate the hot water and a new power cable was run into the tunnel to supply power to operate all the equipment.

Another Cement Plant in Ohio

The Peerless Cement Corp. of Detroit, plans to build a new plant in the Detroit area that will have an annual capacity of 1,000,000 bbl. Peerless already has increased its capacity 95% since World War II.

New Water Resources Projects and Resumptions

Agency and project	Total estimated cost	Money requested for 1956
Navigation		
CORPS OF ENGINEERS		
Mobile Harbor, Ala.	$3,446,000	$1,000,000
Tampa Harbor, Fla.	4,434,000	977,000
Indiana Harbor, Ind.	45,000	45,000
Calumet-Sag Waterway, Ill.	80,238,000	4,000,000
Green River Channel Improvement, Ky.	3,434,000	2,275,000
Mystic River, Mass.	4,500,000	500,000
St. Marys River, Mich.	3,312,000	338,000
Portsmouth Harbor, N. H.	952,000	400,000
Staten Island Rapid Transit Bridge, N. Y.	7,654,000	1,000,000
Delaware R. Phila. to Trenton, Pa., N. J. (specific recommendations to be sent to Congress only on basis that provision be made for adequate cost sharing in some form)	77,100,000	6,000,000
Delaware R. Phila. to sea (Mantua Creek) Pa.	1,600,000	1,000,000
Charleston Harbor, S. C.	200,000	200,000
Corpus Christi Bridge, Tex.	3,590,000	1,500,000
Norfolk Belt Line Bridge, Va.	2,302,000	800,000
Subtotal, 14 projects	**192,807,000**	**20,035,000**
Houston Ship Channel, Tex. (resumption)	3,650,000	500,000
Subtotal, 14 projects and 1 resumption	**196,457,000**	**20,535,000**
Local flood protection		
San Antonio and Chino Creeks, Calif.	12,000,000	700,000
Folly Brook unit, Conn.	263,000	263,000
Portneuf River and March Creek, Idaho	500,000	500,000
Jackson, Ky.	260,000	246,000
Cape Girardeau, Mo.	4,450,000	750,000
Carthage, Mo.	383,000	367,000
East Poplar Bluff and Poplar Bluff, Mo.	354,000	314,000
Wellsville, N. Y.	960,000	350,000
Bradford, Pa.	8,100,000	500,000
Greybull, Wyo.	743,000	300,000
Subtotal, 14 projects and 1 resumption	**196,457,000**	**20,535,000**
North Adams, Mass. (resumption)	14,517,000	750,000
Subtotal, 10 projects and 1 resumption	**42,620,000**	**5,040,000**
Flood Control		
Old River control, La.	46,750,000	2,250,000
Eagle Gorge Reservoir, Wash.	20,500,000	1,000,000
Subtotal, 2 projects	**67,250,000**	**3,250,000**
Beach erosion control		
Hammonasset, Conn.	167,000	167,000
Winthrop Beach, Mass.	340,000	210,000
Hampton Beach, N. H.	140,000	140,000
Atlantic City, N. J.	2,044,000	906,000
Cold Spring Inlet, N. J.	260,000	60,000
Ocean City, N. J.	105,000	67,000
Presque Isle Peninsula, Pa.	2,006,000	600,000
Virginia Beach, Va.	560,000	235,000
Total, 8 projects	**5,622,100**	**2,385,000**
Total, 34 projects and 2 resumptions	**311,949,000**	**31,210,000**
Small projects costing less than $150,000[1]	**2,000,000**	**2,000,000**
Total, Corps of Engineers	**313,949,000**	**33,210,000**
BUREAU OF RECLAMATION		
Irrigation and water supply		
Palo Verde, Ariz.-Calif.	6,889,000	1,985,000
Santa Maria, Calif.	16,690,000	1,000,000
Michaud Flats, Idaho	3,955,000	520,000
Deschutes Haystack Equalizing Reservoir, Ore.	1,600,000	250,000
Chief Joseph Dam, Foster Creek Div., Wash.	4,346,000	631,000
Total, 5 projects, Bureau of Relamation	**33,480,000**	**4,386,000**
Total, authorized: 39 projects and 2 resumptions	**347,429,000**	**37,596,000**

[1] Navigation and local flood protection projects to be selected by the Army Secretary.

Jobs in the News

TRANSFORMER PLANT—General Electric Co. will build a highly mechanized plant in the Hickory-Newton-Conover area of North Carolina for the manufacture of pole-type distribution transformers. The plant will be a 400,000 sq-ft, one-story building fronted by an air-conditioned office building. Estimated cost is $20 million. Robert & Co., Inc., Atlanta, Ga., is architect-engineer.

SHOPPING CENTER—George A. Fuller Co., New York and Chicago, has been selected as chief contractor for construction of a shopping center in Milwaukee. The center, known as Capitol Court, will be built on a 65-acre site and is scheduled for completion in 1956. Estimated total cost is $15 million. Ed Schuster & Co., Milwaukee, is the developer.

AMMONIA PLANT—Girdler Co., Louisville, Ky., has received a contract for construction of an anhydrous ammonia plant for fertilizer at Searsport, Me., for Northern Chemical Industries, Inc. Estimated cost is $9 million.

HOUSING DEVELOPMENTS—M. A. Mace, Fairfax, Va., will construct with own forces a $7-million residential development at Fairfax; Harry Ormston, McLean, Va., is architect. In Babylon, N. Y., Deer Park Homes, Inc., Babylon, will build a $7-million housing development with own forces; Alwin Cassens, Jr., Valley Stream, N. Y., is architect.

Engineers Selected To Plan Mississippi Bridge Approach

The Louisiana Highway Department has selected three engineering firms to prepare plans and specifications for the east bank approaches of the new Mississippi River bridge at New Orleans. (ENR Oct. 21, 1954, p. 22).

The firms are Knappen-Tippets-Abbett-McCarthy of New York, Hardesty and Hanover of New York, and David W. Godat and Associates of New Orleans.

The consulting engineers will have until Jan. 1, 1956, to complete plans for the 8,100-ft bridge approach, a high-level structure that will cost about $15 million. The engineering fee will be 2⅞% of total construction cost.

The state highway department will handle construction supervision of the project.

The bridge approach will run into the projected Pontchartrain Expressway, extending across New Orleans to Lake Pontechartrain. The highway department will let contracts this month for construction of the first stages of the Carrollton Interchange—a $7 million to $9 million structure—which will be located on the Pontchartrain Expressway.

Bids also will be opened later this month for construction of the bridge's four piers, estimated to cost $12 million.

Construction of the bridge proper is the responsibility of the Mississippi River Bridge Authority.

Robert H. Saunders Dies; Ontario Hydro Chairman

Robert H. Saunders, 51, chairman of the Hydro-Electric Power Commission of Ontario, died Sunday in London, Ont.

His death came as the result of injuries received in the crash of a company plane on Jan. 15.

Saunders, who headed the $1.5-billion public utility during its greatest period of expansion, has been credited with having had a lot to do in making the St. Lawrence Seaway and Power Project a reality.

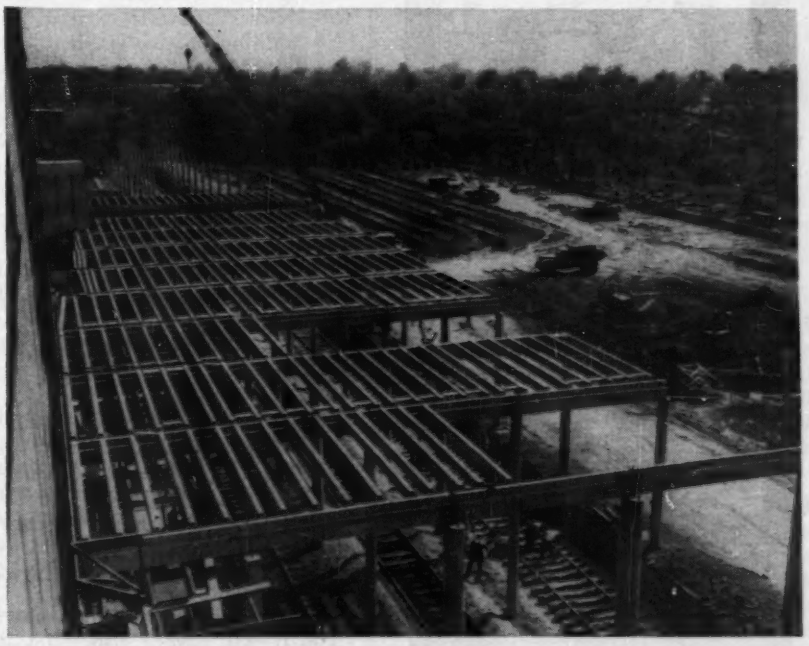
Louisiana Legislature Votes $50 Million for Highways

The Louisiana legislature at a special session appropriated $50 million for use on the state's highways.

Two bills, the only business of the emergency session, were passed by the legislature and signed by Gov. Robert F. Kennon. One provided $30 million for farm-to-market roads; the other, $20 million to match federal funds for urban, primary and secondary roads.

Gov. Kennon called the $50-million program an interim program until a long-range plan based on an Automotive Safety Foundation study can be presented at the regular session of the legislature in May. At the same time, a 16-member joint legislative committee has been appointed to draft legislation for the long-haul program. A recent proposal for using part of the state's oil income to finance a $500-million program probably will figure in legislative deliberations.

Although no decision has been made as to the size of this forthcoming program, Gov. Kennon has stated that a 10-year, $1-billion program is likely. This estimate takes in possible federal funds.



Concrete Blocks Form Factory Framing

Prestressed joists and girders made of concrete blocks support the floors and roof of a 250,000-sq ft addition to the Nashville plant of the Bendix Division of the Crosley Corp.

Designed by Ross H. Bryant, Nashville consulting engineer, the 24-in. block girders span 20 ft and can support 250-psf floor loads. They were made continuous over the columns by the later incorporation of negative reinforcing in cast-in-place topping. Block joists similarly were made continuous. These members support concrete filler blocks between them. In some sections of the building, however, 10-in. channel slabs with a 2-in. topping slab were used instead of the joists. Spencer J. Warwick & Associates, is the architect, and R. C. Mathews, the contractor. Both are of Nashville.

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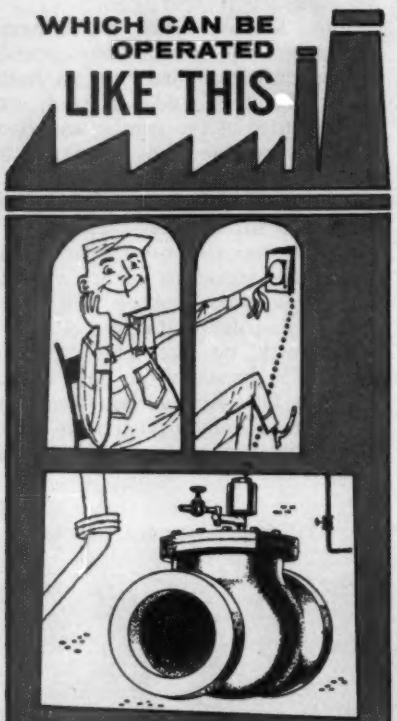

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New York Plans Bridges on Grand Scale

World's largest suspension bridge tops list of three toll projects to be built for city at a cost of $379 million

The world's largest suspension bridge is one of three toll bridge projects totaling $379 million which the Port of New York Authority and its sister agency, the Triborough Bridge and Tunnel Authority, are prepared to undertake at an early date.

Part of a master plan for improving the arterial highway connections of Greater New York City, the bridge projects would require road links costing another $198 million. State and federal aid would figure in the highway aspects of the plan.

The New York City authorities' toll bridge projects—based on a joint study started last February (ENR Feb. 18, 1954, p. 43)—will require approval of the New York State legislature and in one instance of New Jersey. Prompt legislative action is expected by officials of the two authorities.

The three bridge projects proposed by the two New York City authorities:

• A $204-million suspension bridge, the world's largest, across The Narrows of Upper New York Bay, connecting Fort Hamilton in Brooklyn with Fort Wadsworth, Staten Island.

• Addition of a six-lane lower deck on the George Washington Bridge costing $82 million. This famous bridge connects the northern areas of Manhattan with Bergen County, N. J.

• A $93-million, six-lane, single-deck suspension bridge over Long Island Sound, connecting Cryders Point in the borough of Queens on Long Island to the Fort Schuyler section of the borough of Bronx. The site lies between the existing Triborough Bridge and the Bronx-Whitestone Bridge.

• The Narrows Bridge—Although The Narrows Bridge will be built as a two-level structure, only the six-lane lower deck will be used until traffic requires opening the upper deck. Approaches and ramps for the upper deck will require expenditure of another $16 million eventually.

The bridge—anchorage to anchorage 7,200 ft—will have a suspension span of 4,400 ft, 200 ft longer than the Golden Gate Bridge in San Francisco and 900 ft longer than the center span of the George Washington Bridge up the Hudson River from the proposed site. Bridge towers will be 700 ft high, clearance at mid-span above mean high water will be 237 ft.

The facility will provide northerly connections via the Brooklyn-Battery Tunnel with Manhattan and also with the Brooklyn-Queens Expressway leading to Long Island, Westchester County and New England.

Staten Island approaches are designed to provide a southern bypass route for through traffic around New York City midtown areas as well as to Staten Island give its only direct vehicular connection with the city.

The Triborough Authority has a federal government permit for the construction of a bridge across The Narrows. Financing arrangements will be instigated immediately after state legislative approval is given.

Under the plan, the Port Authority would finance and construct the bridge, then lease it to the Triborough Authority. Triborough would acquire ownership sometime prior to 1969.

• George Washington Bridge—A 75% increase in the existing hourly capacity of the George Washington Bridge is sought by construction of the six-lane lower level.

Since the bridge originally was designed to accommodate a lower deck, this can be built in about two and one-half years for about $20 million.

Approximately $62 million will be spent modifying structures providing interchange with the Henry Hudson Parkway and Riverside Drive, in modification of existing approaches to the local Washington Heights area and construction of an eight-lane, open-cut, East-West Expressway that would connect the bridge with the Cross-Bronx Expressway now under construction across the Harlem River from Manhattan.

• The Throgs Neck Bridge—Third major structure represented in the plan is a 5,200-ft, six-lane suspension bridge that would connect Long Island with the Bronx paralleling existing Triborough and Bronx-White-Stone Bridges. This $93-million structure will be a 3½-year job.

• Connecting highways—More than $198 million in state and federal funds must be spent on outlying arteries.

Brooklyn connections with The Narrows Bridge would cost an estimated $39 million, while those for Staten Island would cost at least $35 million.

More than $60 million would be spent on an East-West Expressway connection with the western end of the George Washington Bridge in Bergen County, N. J.

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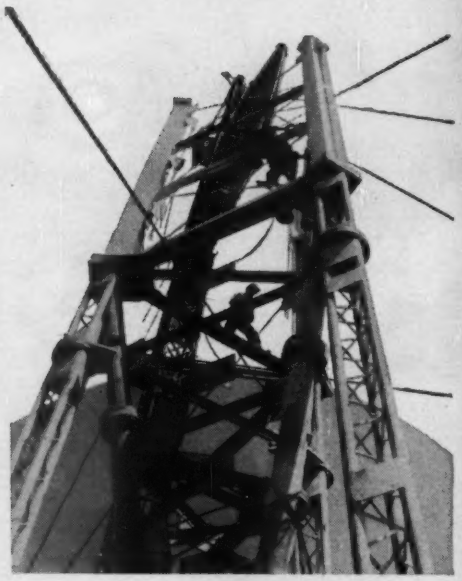
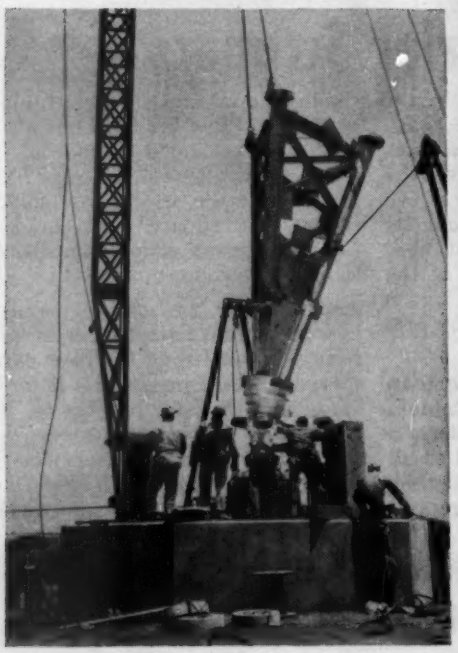
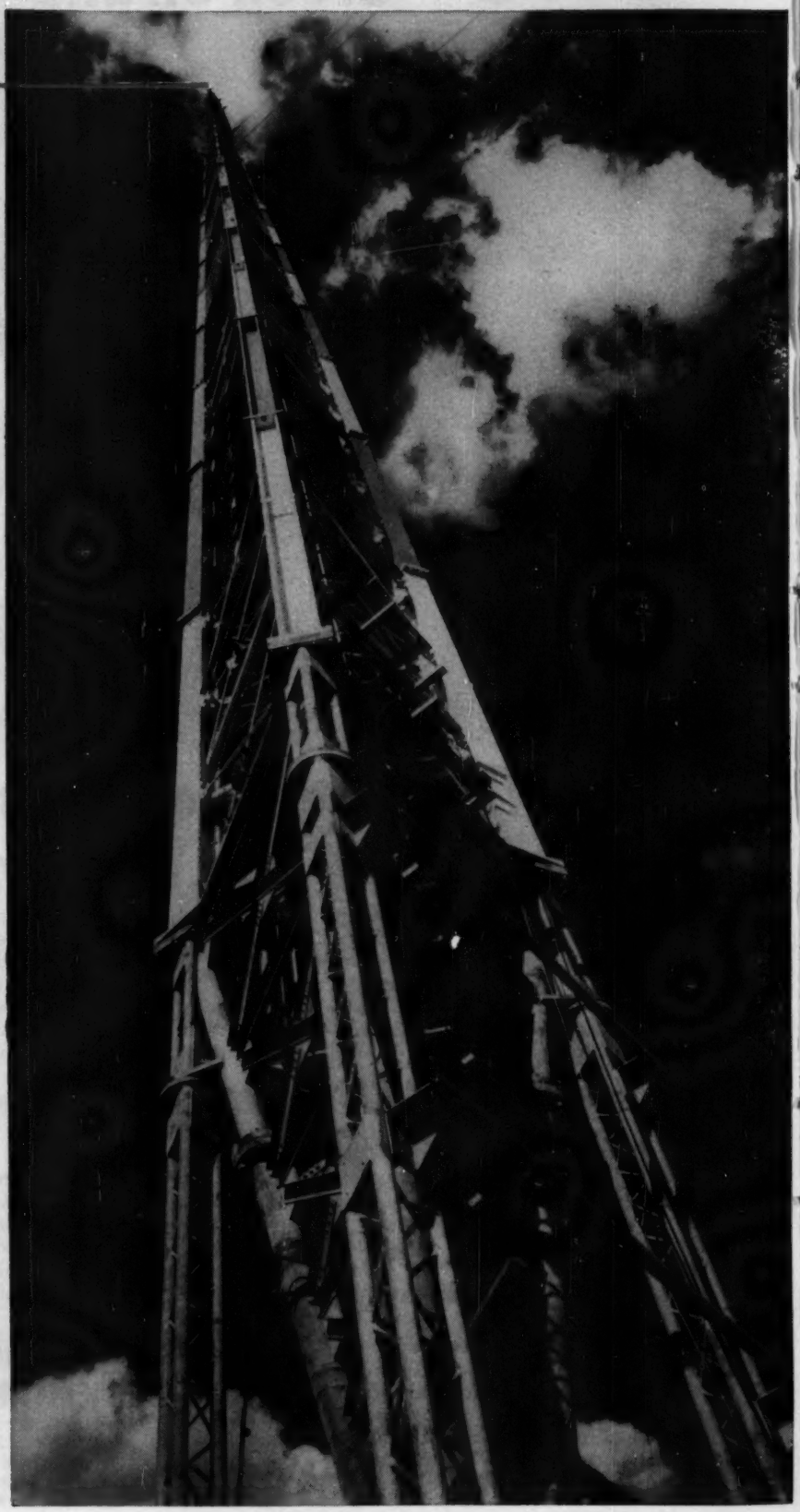


Here the self-raising, traveling gin pole is being positioned inside the first tower bay. With this unique rig the complete erection was accomplished in nine weeks, just half the time ordinarily required.



Erecting the forged steel base section of this record-breaking tower.



man-made structure...

USS MAN-TEN Steel

provides the needed combination of high strength with light weight

THE 1,572-foot television tower of Station KWTV in Oklahoma City dramatically illustrates the advantages obtainable with USS MAN-TEN High Strength Steel in structures where both great strength and light weight are imperative.

From this record-height tower which is 100 feet taller than the tip of the antenna atop the Empire State Building, the KWTV telecasts will cover an area of over 27,000 square miles.

The sheer magnitude of this structure posed its own problems. The hazards of wind pressure and ice formation added others equally difficult. The design engineers were faced with the job not only of raising a structure of breath-taking height but one that above the 780 foot level would resist winds up to more than 150 miles per hour.

For certain sections of the tower, they specified USS MAN-TEN steel —to obtain high strength with no increase in weight and to reduce weight without sacrificing strength.

USS MAN-TEN Steel was selected for the KWTV tower construction for these specific purposes:

—*To supply needed strength* to the intermediate sections where maximum diameter mild rolled steel rounds were simply not strong enough to carry the load of the tower above.

—*To save weight* in the topmost bays where mild steel although strong enough could be replaced by lighter sections of USS MAN-TEN Steel of equal or greater strength.

—*To reduce wind resistance* in the topmost bays, where smaller sections of USS MAN-TEN Steel provided the same strength as bulkier, heavier, mild steel sections.

CONSTRUCTION FACTS

This tower is triangular in section, 12 feet on a side. All structural members were shop welded. Field connections were made with galvanized structural ribbed bolts secured by galvanized locknuts.

The three legs of the tapered base, assembled on the ground in two parts, are forged steel rounds 10½ in. in diameter. Above the base, up to the 300 ft. level, the legs are vertical 14 in. 314# wide-flange mild steel beams. Next come two sections of 9½ in. mild steel rounds. Above that are 25 sections, each 30 ft. long, solid USS MAN-TEN steel rounds stepping down from 8 in. to 6 in.

For the next 60 ft. there are 4 and 5 in. mild steel rounds and, finally, on top, the antenna support framework is made up of 8x8x1⅛ in. MAN-TEN angles. The 30 ft. long sections were erected by means of an unique, electrically operated traveling gin pole especially designed for this job, and went up at a rate of 90 ft. per day to complete the frame erection in only nine weeks time.

The structure was designed by R. A. Vaughan, chief engineer, Orville Pelkey and James Welsh of the Dresser-Ideco Co., Columbus, Ohio. Ideco fabricated the steel and subcontracted erection to Mixell Construction Co., Ganado, Texas. Leonard Mixell, president of the subcontracting firm, designed the self-raising gin pole.

Here is a job that while unusual is still typical in that it illustrates how USS MAN-TEN Steel and other USS High Strength Steels are today being increasingly used by structural engineers and bridge designers to build safer, more dependable, more durable structures than possible with steels used hitherto—often at lower cost as well. We'd be glad to discuss this matter with you anytime at your convenience.

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See "THE UNITED STATES STEEL HOUR"—Televised alternate weeks—Consult your newspaper for time and station.

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5-297

UNITED STATES STEEL

Darex Diary

by Henry L. Kennedy

Past President, American Concrete Institute
Mgr., Construction Products, Dewey & Almy Chem. Co.

* Examples of the savings to taxpayers brought about by air entrainment

* "Zero slump" concrete vs. plastic concrete

I WONDER if you have really considered how air entrainment has affected the economy aspects of construction . . . and how it helps the taxpayer. I think one of the outstanding examples is in the construction of mass concrete. Before the use of air entrained concrete, it was customary to use 4 sacks of cement per cubic yard for the interior of the dam structure. Now 2½ sacks of cement per cubic yard is not uncommon, and on a recent dam, more than ¼ million cubic yards of concrete were poured with 2 sacks per cubic yard. The job finished up at 2¼.

One of the engineers on a new dam in California told me that he had estimated savings of approximately $2,000,000 on that particular dam through the use of air entrainment. This came about not only through the use of a lower cement content, but also because of a decrease in the cost of the cooling mechanism (because of the lower cement content) and because they use less of the fine aggregate. In the case of the 2½ sack concrete, probably 19% sand would be used; whereas in the plain concrete using a 4 sacks/cubic yard mix, the sand content would be 28-30%. A saving is also realized in the vibrating equipment.

* * *

ON a recent trip overseas, I found wide use of what they term "zero slump" concrete. However, I like to term it "*minus* zero slump" concrete, for the reason that the water content often was reduced to an extent well below that at which zero slump would first occur. With the help of excessive vibration, it can be placed; and high compressive strengths are obtained. However, the concrete is not homogeneous and not as durable as a low-slump, plastic, air entrained concrete with a somewhat lower strength.

In one country, I was invited by the engineers to duplicate a 3" maximum size mix which they had just completed, and which required a total of 45 seconds vibration. They told me to use U. S. techniques. There happened to be some air entraining agent available, (a brand in which I have complete confidence!). I used it on the basis of 1 ounce/sack. Looking over the sand gradation, I noted a decided deficiency in the minus 30 mesh size, so I increased the percentage of this size about 5% and subtracted the same from the larger fractions. I increased the water four points.

After the usual amount of mixing, the material was, as is their custom, dumped out on the concrete floor. The remark was made, "but this mix is as dry as our own". I explained to them that the mix was no wetter, but that the matrix was a plastic mix and that when we screened out the 3-inch size, we would probably have a slump of 1 inch. I expected that the vibrating would be nearer 5 to 6 seconds than 45 seconds. When the slump was measured, it was just over 2 cm. and the vibrating time was 4 seconds.

I was delighted to hear not long ago that their concrete highway specifications had been changed to a 1 to 2" slump and 4% ± 1% air.

Here's a partial list of Dewey and Almy products for the cement and concrete industries

DAREX AEA — the world's leading brand of air entraining agent

DARALITE — air entraining agent for use with lightweight aggregates

DARACONE — extra-durable silicone water repellent

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CITY BY CITY

Start of a Civic Center

New Orleans—Back in 1946 New Orleans started acquiring an 11-acre site on the fringe of the main business district for a civic center. This week city officials are getting set to award a $7,019,000 contract for construction of the center's first building—an 11-story city hall.

The successful bid for construction of the city hall—submitted by R. P Farnsworth & Co., Inc.—was lowest of eight received.

Multi-story wings on each side of the city hall will house a council chamber and a 700-car garage. The Farnsworth bid calls for construction of the city hall within 700 days after issuance of a work order, and the garage within 300 days.

Plans and specifications, supervision, landscaping and site development plus other contingencies will bring the project's total cost up to some $7.9 million. But $7 million in bonds already has been sold and the rest of the money will be raised from the sale of the old buildings and land vacated by the city government.

$100-Million City

Sterling, Mich.—Construction of a $100-million city in Sterling Township, 14 mi north of downtown Detroit, is expected to get under way sometime this spring.

Under the project—reportedly the largest real estate development in Michigan's history—a community of 30,000 will rise on an 8-mi square site, located in a rapidly expanding industrial area.

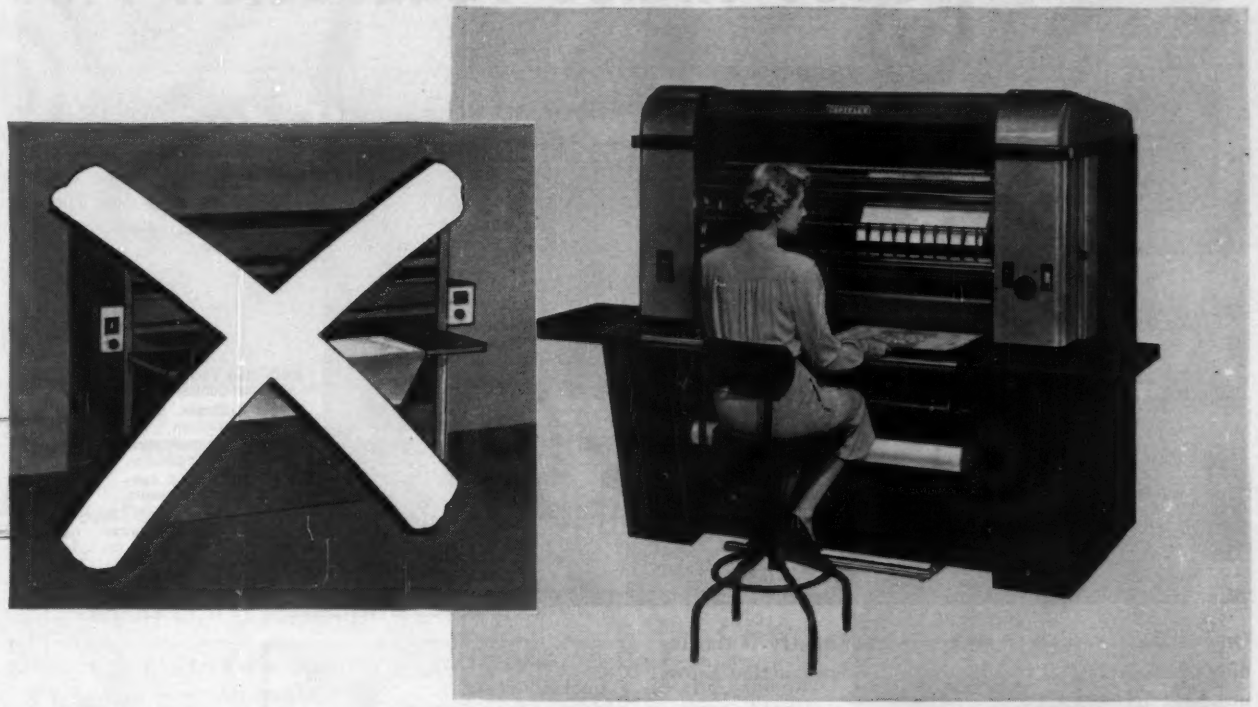
Plans call for approximately four schools, four churches and one shopping center for each square mile of the community. All-paved curvilinear streets will be 60 ft wide with 30-ft pavements. Lots will be 60 x 150 ft.

Real estate broker Carl R. Sams, developer of the present plan, claims to have enough backers to finance the entire project as well as definite commitments from more than 50 homebuilders.

Sterling Township officials have agreed to build a sewage disposal plant with a connecting trunk sewer on the basis of estimated tax revenue.

A 36-in. water main now serving the nearby Chrysler-Navy jet engine plant will be used by the new community and surrounding industry. The main is owned and operated by Sterling Township, which purchases water from Detroit.

The Big Switch is to *Copyflex*



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Driving Armco Foundation Piling for the Indiana Toll Road. This installation is a bridge project over the Sycamore Road, 10 miles northwest of South Bend, Indiana.

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Chapin & Chapin, Inc.—Sub-Contractors
J. E. Greiner Company—Consulting Engineers
Charles W. Cole & Son—Contracting Engineers
Pierce, Gruber & Beam, Inc.—Sub-Contracting Engineer

One of the newest expressways in the country is the Indiana East-West Toll Road, now under construction across northern Indiana.

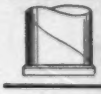
In Sections C-24 and C-25, Armco Foundation Piling is being driven for a bridge foundation. This piling is 14" O.D., in .188" wall, with a design capacity of 30 tons. Many of these piles were actually driven over 60 tons capacity without difficulty. This is just one of six grade separations in these sections.

Workman welding cone points to the Armco Foundation Piling used on this project.

FOUNDATION PIPE FOR EVERY NEED

Few foundation pipe jobs are alike. But with Armco Pipe Piles, Caissons and Pile Shells to choose from—you'll find it easy to match almost any requirement. See table for sizes.

ARMCO FOUNDATION PIPE

DESIGN	PRODUCT NAME	DIAMETER O.D.	WALL THICKNESS	LENGTHS
	ARMCO PIPE PILES	8⅝" to 22"	.141" to .500"	Up to 93 feet
	ARMCO CAISSONS	24" to 36"	.375" to .500"	Up to 70 feet
	ARMCO HEL-COR PILE SHELLS	8⅝" to 22⅛"	18 to 14 Gage	Up to 60 feet

For specific data on your foundation problems, write us. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 3955 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

ARMCO®

ARMCO FOUNDATION PIPE

INEXPENSIVE TESTS in San Francisco Bay mud covered by shallow water are made by two-man crew with simple equipment. Third man is inspector.

MANPOWER is enough for retractable-plug sampler and vane-shear testing.

How to Stretch Soil-survey Dollars

Low-cost tools for subsurface exploration broaden the usefulness of a few expensive cased borings.

S. S. Cooke-Yarborough
Knappen-Tippetts-Abbett-McCarthy
New York, N. Y.

It is sad but true that the budget for subsurface investigations usually is paltry when an owner gets through trimming his engineer's recommendations for an up-coming construction project. The soils engineer then must proceed to make the most of what he has left, perhaps muttering about policies that are penny-wise and pound-foolish.

For the foundation has to be safe. With limited data on subsurface conditions the soils and foundation engineers must be conservative in their designs, the meanwhile being acutely aware that more information would enable more precise designs and, probably, construction savings far greater than the cost of adequate data.

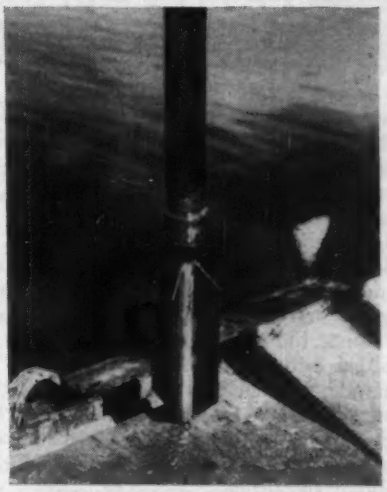
In making the most of what he has, the soils engineer must look for techniques that will stretch his budget dollar. Some techniques are well-known, some are invented or brought from obscurity or from great distances. An example of the relatively unknown technique is the vane shear tester, a simple European device. Used in conjunction with two better-known methods, the vane shear tester may help yield complete coverage for restricted cost.

Two projects for which a complete coverage was obtained for relatively low cost are the proposed expansion to Metropolitan Oakland International Airport, Oakland, California; and the Puerto Nuevo-Martin Pena Market Development, San Juan, Puerto Rico.

At Oakland a new runway, taxiways and terminal area are to be constructed up to one mile offshore from the present airport. This requires filling in San Francisco Bay on a very soft clayey organic silt deposit, which varies in thickness from 9 to 18 ft. Water depth varies from 0 to 5 ft at low tide, and the normal tide range is 6 ft.

At San Juan a 100-acre site is to be filled, sand-drained and surcharged prior to development of a wharf and a marketing center. The site is in swamps at the south side of San Juan Bay and is partially covered by water. Those portions not covered by water are mostly mangrove swamp, where the ground is so soft that it barely supports a man. Elsewhere, maximum water depth is about 2 ft at low tide; tide range is 1 ft. Foundation conditions are notoriously bad, consisting of 25 to 35 ft of very soft clayey organic silt, overlying firmer deposits.

• **Tools for the tests**—The success of these projects depends primarily upon the foundation design, and since both areas are large, it was expected that the conditions would vary considerably from point to point over the sites. How to obtain adequate subsurface data within reasonable costs was a problem. It was solved, however,



VANE SHEAR TESTER is attached to actuating rod in retractable-plug sampler.

TORQUE MEASUREMENT is taken as vane shear tester is rotated by rod.

by three methods: Conventional cased borings yielding drive, shelby tube and stationary piston-type samples, one-inch retractable plug sampling, and in-place vane shear testing.

Of these, the first (and the most expensive) requires no introduction.

The one-inch retractable plug sampler is not new either, the principle having been first employed in a peat sampler 45 years ago. It has been used in various forms by several individuals and agencies, but the model used on these jobs was developed by the writer. A casing of 1¾-in. outside diameter is fitted with an annular bit at the lower end. A plug, attached to an actuating rod that passes through the casing, can be seated inside the bit circle. The lowest section of the casing receives a series of liner tubes through which the plug can pass.

In operation, the casing is pushed or driven into the ground with the bit closed by the plug. At the depth where a sample is required, the plug is retracted by withdrawing the actuating rod to a point where the plug can be secured. This prepares the sampler to receive the sample. The sampler is then advanced to fill the liner tubes, after which it is withdrawn from the ground by jacking and the liner tubes removed for recovery of the samples.

Since the casing and actuating rods are in 3-foot lengths and the driving hammer, which is a slip-weight working on a guide attached to the top of the casing, weighs only 35 lb, all parts of the sampler are easily handled and transported.

• **Vane shear test**—In-place vane shear testing is a technique developed in Europe and used quite extensively there. So far, its use in the United States has not been widespread and has been largely confined to research work. The principle is that a rod—to which four thin metal vanes are attached—is forced into the soil and is then rotated until the soil around the circle circumscribing the vanes is sheared. The torque required to cause this shear is measured and the soil's shear strength is computed.

For the Oakland and San Juan projects a vane with an overall width of 2½ in. and height of 6 in. was attached to the bottom of the actuating rod of the retractable plug sampler, replacing the plug. The sampler was pushed into the soil with the vane unit projecting just below the bottom of the sampler. Eighteen inches above the level at which the vane shear test was required, advancement of the sampler was stopped. By pushing down on the actuating rod the vane unit was advanced 18 in. below the bottom of the sampler. The vane was then rotated by means of a torque meter fixed to the top of the actuating rod.

Upon completion of the test, the vane was retracted until it was once more in contact with the bottom of the sampler, after which advancement of the sampler was continued until a point 18 in. above the next test was reached. At Oakland the cost of the vane shear tests was about $5.00 each and in Puerto Rico $2.00 each.

• **Cased borings control**—At both of these sites a small number of cased borings were made at widely separated parts of the site. The areas between these borings were investigated by a relatively large number of one-inch borings and by vane shear testing. From each of the cased borings undisturbed samples were obtained for laboratory testing for shear, consolidation and physical constants.

Adjacent to each cased boring, vane shear tests were made at the same level from which undisturbed samples were taken. Specimens from the undisturbed samples were tested for shear strength by means of triaxial compression tests, imposing the overburden pressure as the confining pressure. By comparing the results of adjacent triaxial and vane-shear tests, a relationship between the two was established to assist in determining the true shear strength of the material.

• **Cased borings costly**—In order to make the cased borings in the unprotected water of San Francisco Bay, which frequently becomes rough, a regular 40x16-ft piledriving barge with a crew of four had to be used to provide adequate space and safety.

In addition, a tug had to be in attendance at all times to assist in moving and mooring the barge, and to move the personnel between the barge and shore. Moreover, the draft of the barge made moving at low tide difficult, thus requiring working with the tides and resulting in extra costs for overtime.

The one-inch sampler, on the other hand, was run by a two-man crew from a 16x8-ft steel scow. The sampler was operated through a 10-in. pipe passing through the center of the scow and required only hand tools to operate it. The scow was equipped with an outboard motor and thus was self-powered. Furthermore, its shallow draft allowed free movement over the site at all stages of the tide. These factors resulted in the price for one-inch borings being $3.70 per ft less than for the cased borings.

• **Two rowboats enough**—In Puerto Rico, the shallow water over much of the site and the small tide range, made moving a full sized rig difficult, and much time was lost waiting for the tide to give flotation.

The one-inch sampler, however, was operated from a deck consisting of boards fixed to the gunwales of two shallow-draft rowboats. This float could move over all the water-covered portion of the site at low tide. This mobility together with the smaller crew required, resulted in a bid $4.25 per foot less for the one-inch borings than for the cased borings.

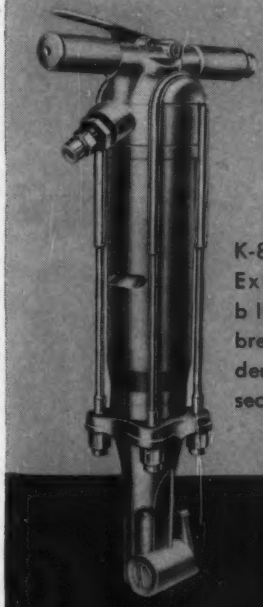
In addition, for moving a drill rig into position through those parts of the site covered by mangrove swamp, the contractor bid $9.00 per hour, but the cost of moving the one-inch sampler through the same swamp was absorbed in the unit price for one-inch sampling.

• **Quantities**—Economy of the system and coverage obtained can be seen from the quantities of work performed at each site. At Oakland 354 ft of cased hole were made, 428 ft of one-inch boring and 47 vane shear tests, while in Puerto Rico the quantities were 417 ft of cased hole, 655 ft of one-inch boring and 337 vane shear tests.

Of course it must be realized that the use of the one-inch retractable plug sampler and vane shear test attachment is limited to soft silts, clays and loose sand. Furthermore, limitations of the information obtained must be realized. For instance, one-inch sampler specimens must not be considered undisturbed samples.

• **Vane test reliable**—On the other hand, the shear-strength values given by the vane shear tests probably are as reliable, if not more so, than those obtained by triaxial compression testing, since they measure the shear strength of the soil in place.

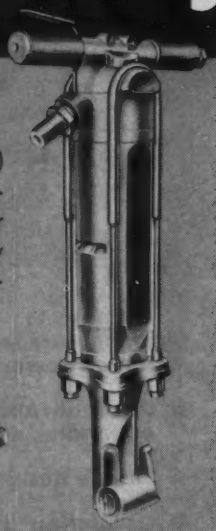
Design, supervision and analysis of the foundation explorations at Oakland were performed by Knappen-Tippetts-Abbett-McCarthy for the Port of Oakland, for which Dudley W. Frost is port manager, Joseph G. Bastow is assistant port manager and chief engineer, and Don W. Martin, airport manager. The work in Puerto Rico was performed for the Puerto Rico Transportation Authority for which Salvador V. Caro is general manager and Raphael Seijo Tizol is chief engineer. For both jobs Walther Prokosch was project engineer, while the writer was in charge of the foundation investigation and design.



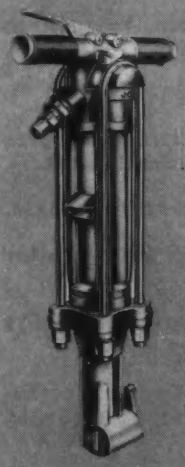
K-89 (90 lbs) Extra heavy blows for breaking tough, dense concrete sections.

Here's what you get in a

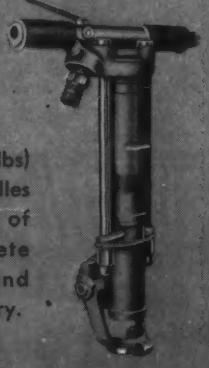
JOY PAVING BREAKER



K-81 (80 lbs) Rapid, powerful blows for breaking heavy reinforced concrete paving.



K-61 (65 lbs) Wide range of application for medium demolition and heavy spading.



K-31 (30 lbs) Easily handles demolition of thin concrete sections and light masonry.

LONG WEAR Cadmium plating inside and out prevents rust and corrosion. Cadmium, which develops lubricating qualities under heat and stress, eliminates scoring and facilitates running-in. Long life is further assured by a throttle-controlled lube system. Each movement of the throttle shoots exactly the right amount of oil to all working parts.

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OPERATOR COMFORT The piston of a Joy Breaker never strikes the front head. A cushion of air absorbs the blow after the full force has been delivered to the breaker tool. This reduces shock, vibration and operator fatigue. The streamlined design allows the operator to lift and slide the breaker against his leg without collecting bumps and bruises from projections.

FREE BULLETIN Complete details on Joy Paving Breakers can be had by writing for Bulletin 87-P to ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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The Adnun Jr. is the only tow-type bituminous paver that brings you the advantages of engine power for moving the empty paver on the job. In close quarter work, up against garage doors, inside of walls, close to buildings, in fenced playfields and similar work, Adnun power is an invaluable time saver and cost reducer. It eliminates much hand work, cuts down on manpower and makes possible a better job.

If you are bidding on non-highway specification work, the Adnun Jr. will permit better bids and give longer, trouble-free service. Ask for details on this high-quality tow-type rig.

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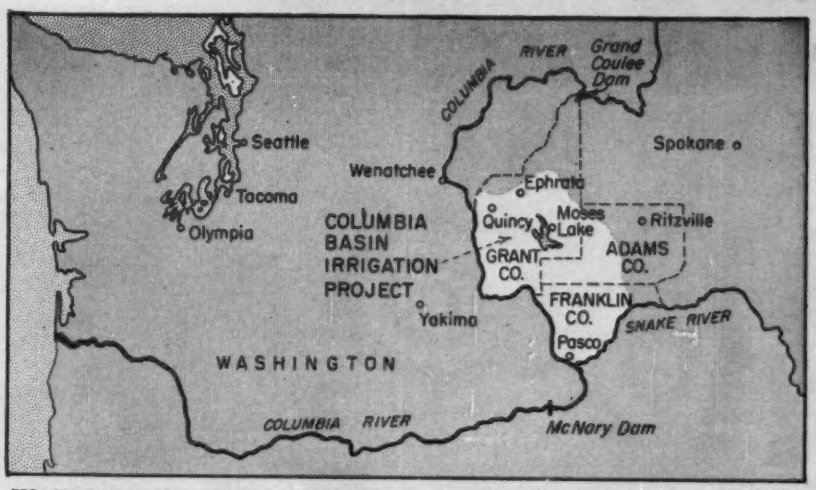


WASHINGTON'S GRANT COUNTY must provide 800 miles of farm roads. Other Columbia Basin Irrigation Project counties—Adams and Franklin—have similar, but less extensive, works programs.

Problem: $7-Million County Road Net

Newly-opened irrigated land needs roads—Good financing, good engineering provides answers for Columbia basin

The mammoth task of building 800 miles of farm-to-market roads in Grant County, Wash.—heart of the million-acre Columbia Basin Irrigation Project—is now about half completed. When the job is done, the roads will serve new farm homesteads covering two-thirds of the Bureau of Reclamation's largest irrigation project.

The $7.3 million program has presented County Engineer James Dodson with the job of building more miles of new roads than a number of state highway departments construct over a period of years. How it's being done is a lesson in "boot-strap" operations.

What makes the road construction program necessary is gradual development of the irrigation program.

The first 66,000 acres of Columbia Basin project lands went under water in 1952, and the program calls for an additional 50 to 60,000 acres annually for several years to come. The land—previously all but uninhabited—is divided into "family sized" farms of 60 to 120 acres each.

• **Financing**—The road construction program is being financed by federal aid and by a Columbia Basin bond program authorized by the state.

The legislature, in 1951, authorized a $5 million bond issue for road building in the three basin counties of Grant, Franklin and Adams. The bonds are amortized by withholding a share of each county's allocation of state gasoline tax revenue over a 25-year period. This method permits repayment under existing levies and tax rates without changing the state's basic highway financing practices.

The plan was devised by Dodson, who at 55 has had 35 years experience in road building work. Helping in the plan development were Neil R. McKay and Avery Loethspeich of the Washington State Highway Department, and Paul Bickford, of the Bureau of Reclamation.

Dodson and the others sold the state legislature on the idea of using the state motor vehicle fund as a security for the bond issue. The legislature provided, however, that not more than 50% of any county's share could be withheld for this purpose.

Gasoline tax revenue in the state is now being distributed to the counties under a factor system, whereby a weight of 70% is allotted to trunk road mileage. And since about 90% of the county road network in Grant County (in the project area) could qualify as trunk road mileage, the new roads would readily generate the revenue to meet provisions of the bond retirement program.

The situation could prevail regardless of where the money was borrowed. However, only the state legislature could insure continuation of this method of distribution over a 25-year period. Thus, the salability of the bonds would be assured by a guaranteed amortization program.

Grant County's share of the 1951 bond program amounted to $3.2 million and Dodson is now trying to get the 1955 legislature to extend the bond program to permit completion of the Basin road building project. Grant County will need another $2.5 million in bond money and $1.6 million in federal aid to finish the job.

Already built or ready for construction in the Grant County portion of the Basin project are more than 400 miles of farm to market roads, of which 100 miles are arterials and the rest feeders. Arterials are being built at an average cost of about $14,000 a mile and feeders at about $7,500. Average cost for all roads runs from $9,000 to $9,200.

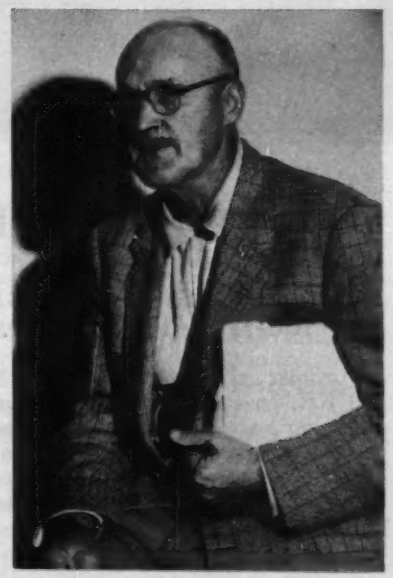
• **Lineal mile bids**—If Dodson's plan for financing the road program was unique, so was his approach to the engineering job.

After clearing the financial hurdle, he started giving serious consideration to having the roads built on the lineal mile bid basis instead of the usual unit price bid. He talked the idea over with local contractors and state highway officials—some of whom were skeptical at first. After three years' experience with this method, he points out that the results have been gratifying and contractors generally have been turning in lower bids.

Under the lineal mile plan, contractors bid on the grading, draining and surfacing, all in one job. Dodson points out that with the old unit price plan contractors tended to bid high on the excavation and low on the surfacing.

"The cubic yard bid doesn't give the final cost, it only gives a comparison of bids to determine the low bidder," says Dodson, who points out that unit price jobs can and often do overrun the original bid figures.

(*Continued on page 42*)



COUNTY ENGINEER, James Dodson, directs Grant County road construction. He helped convince the state legislature that a bond issue was necessary.

Portable plant proves best for Turnpike job

HIGHLAND AGGREGATES MOVES PLANT ALONG 100-YEAR-OLD WASTE PILES TO PRODUCE BASE COURSE

Turnpike...TURNPIKE...TURNPIKE. In some areas that's about all you hear discussed among construction men these days and it's a good thing too, because goodness knows, our whole highway system has been lagging long enough.

Modern plant in old quarry

One of the exciting examples of modern highway construction is the Ohio Turnpike, and up near South Amherst, in Ohio, you'll find an interesting operation in progress. There, at an old, old quarry, you'll find a modern, up-to-date crushing plant producing base material from 100-year-old refuse piles of cut stone waste.

Now processing base material isn't exactly news in itself. But construction men *are* interested in why a portable Two-Unit plant was placed on this job.

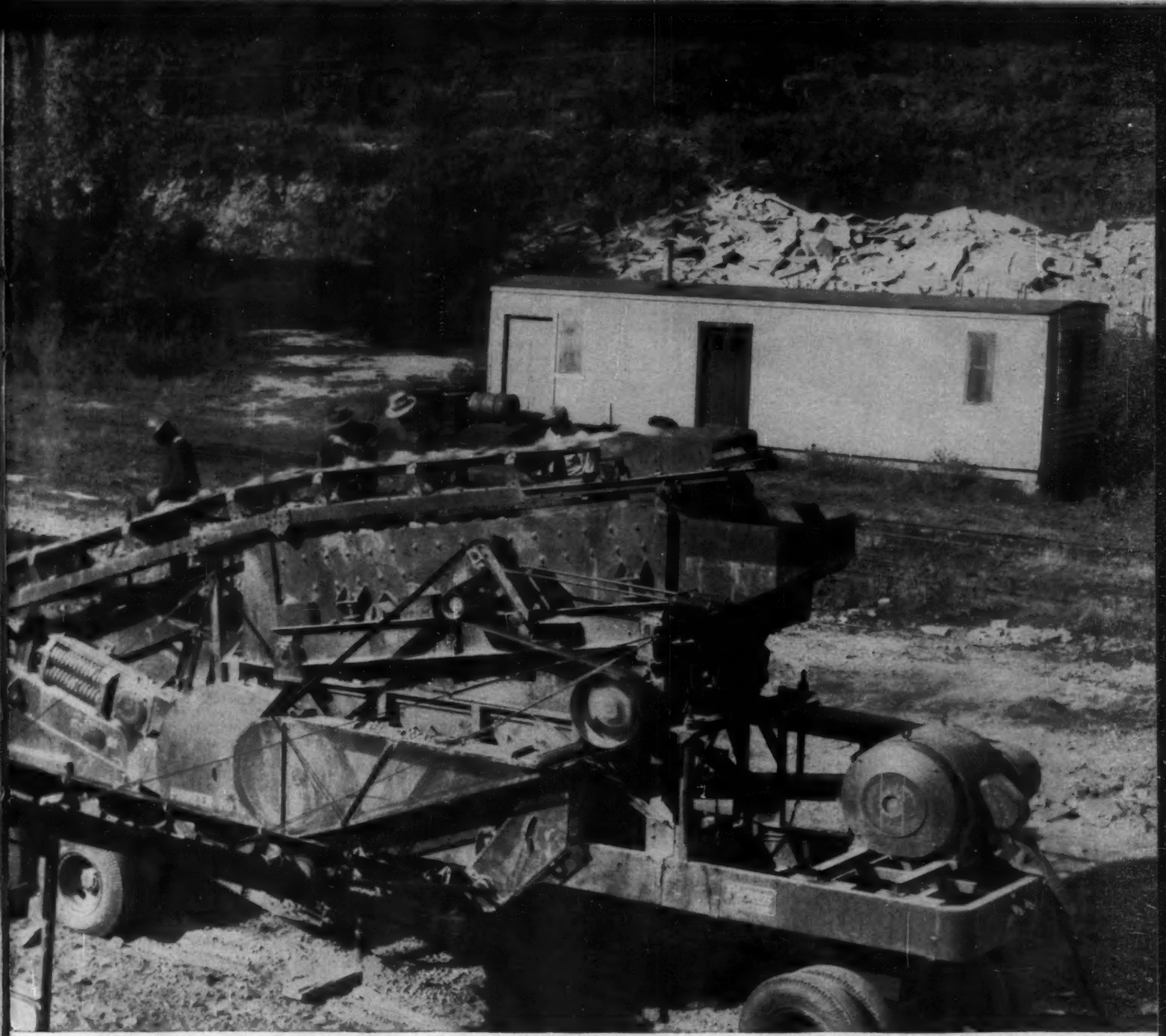
Old piles hold usable material

It all started when the Highland Aggregates Company discovered that these huge piles of waste rock, owned by Cleveland Quarries, were suitable for use on the Turnpike. But this rock, having been dumped in a long row by railroad cars, posed a problem as to selection of the right kind of crushing plant.

J.W. Gutermuth and A.J. Hoffman, executives of Highland Aggregates Company, referred the problem to their equipment distributor, the Williams Tractor Company, who in turn, called in a PIONEER expert. A survey of the material and site showed two alternatives: (1) a stationary set-up, using trucks for all hauling or (2) a portable rig, to eliminate trucks for hauling the feed.

A "natural" for a portable plant

The economics involved showed that this was a "natural" for a Two-Unit portable plant, even to placing the



step-down transformers for the electric power in a portable house. Thus it remained only to determine from the size of feed, the gradation of the product, and the output desired—the proper size of plant.

In the PIONEER plant selected, the primary consists of a 3042 jaw crusher and a 42″ x 14′ apron feeder. The secondary includes a 54″ x 24″ twin roll crusher and a split feed type 4′ x 12′ 3½ deck vibrating screen.

Split feed yields extra output

Normally, in an installation of this kind, one might expect to find a bottleneck in screening capacity. However, in the split feed screen, found only in PIONEER plants, decks are so arranged that half the product from the crushers is fed to the top deck and half to the bottom deck. Oversize from both decks feeds to the twin roll for secondary reduction. Material passing top and bottom decks is collected in the hopper under the screen for delivery to trucks.

Offers twice normal screening area

This arrangement of the screens actually provides *twice* the normal screening area of a 4′ x 12′ screen, or 96 square feet—and makes possible a production figure in this case as high as 400 tons an hour, and an easy average of 300 tons.

PIONEER Two-Unit Plants for both rock and gravel combine the advantage of large units with that of easy portability, and provide a flexibility in operation which is not possible in any other type plant. For example, the secondary can be used separately from the primary to permit crushing from surge piles, or each plant can be used independently on a different job.

Available, too, is the exclusive PIONEER triple roll secondary, which allows the feeding of larger rock to the rolls. This increases production because the jaw crusher in the primary can be operated at a larger setting.

For full particulars on the application of the Two-Unit Plant to your operations, write to Pioneer Engineering Works, Inc., Minneapolis 13, Minnesota (subsidiary of Poor & Company, Chicago) or see your nearest authorized PIONEER Distributor.

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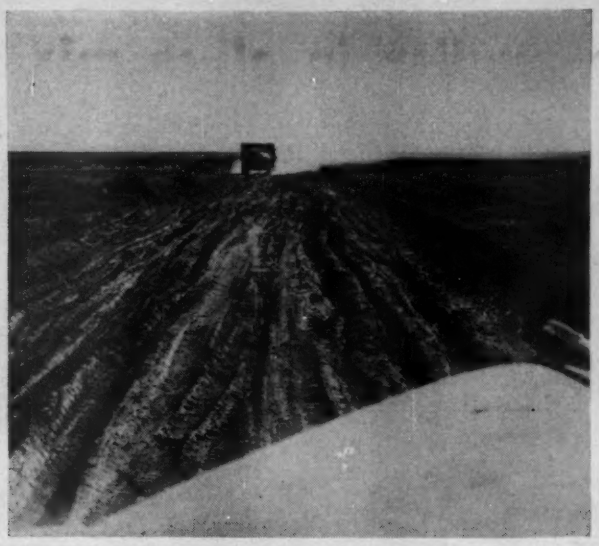


RUTTED, DUSTY ROADS like this are being replaced.

BRIDGES are built under direction of Bureau of Reclamation.

The lineal mile bid, he adds, is figured by the mile of completed road and can't exceed the bid figure.

"The lineal mile bid makes the contractor get down to business and figure the job on an actual cost basis to complete the work. He can't get the plans changed and there are no arguments over classification of excavation."

• **Engineering**—Dodson and his crew of 30 engineers in the county highway department have been faced with several construction problems. The engineering staff mapped out a road network in which no farm unit in the county would be more than two miles from the nearest arterial. Feeder roads were planned to serve every farm unit.

Roads were planned to follow the contours of the land as much as possible and many of the feeders were routed parallel to the laterals carrying water for the project.

The character of the soil is a problem in itself. Prior to canal construction by the Bureau of Reclamation, says the engineer, road building would not have been possible on the same basis.

The light volcanic ash found in many parts of the Basin is extremely hard to handle—it has a tendency to shift or blow away.

But the construction of canals and laterals has made the job somewhat easier. Reclamation construction work and road building have gone along hand in hand. Water sent through the canals and laterals is readily available for wetting down the grades in the road building work.

• **Water problem too**—Although water is a blessing, it also is a problem. Much of Grant County's road mileage is being built near or parallel to canals and laterals. These waterways often leak during the first few years after construction and the seepage has sometimes threatened to undermine roads under construction or already built. More water comes from the runoff or waste water from farm units already under irrigation. In some cases road building work has been halted during the irrigation season because of the water problem.

• **Standards**—Dodson started out with an arterial design that was 26 ft wide with a 5-in. thickness of coarse ballast and 2-in. thick top gravel course. Ditch slopes are 2 to 1. However, he points out that the original design has been altered.

The Bureau of Public Roads insisted that the county show an average daily traffic of 100 cars a day before oiling arterials being built with federal aid money. As a result, there were cases where the top course and ballast became mixed before oiling. Accordingly, it was decided to reduce the size of the base material from 3 in. minus rock to 1 in. minus rock. This makes road maintenance before oiling much easier.

Feeder roads were designed to be 24 ft wide with 1650 tons of 1 in. minus single course surfacing to the mile. In actual practice, Grant County has been placing an average of 1000 tons to the mile, placing the other 650 tons in stockpiles to be used as needed for maintenance.

In addition to providing water, Bureau of Reclamation canal construction has made available for the road building program material excavated for canals. And bridges crossing the canals and laterals are built by the Bureau of Reclamation as part of the irrigation construction program.

Another problem was securing an adequate staff of engineering personnel for the road building job. Experienced engineers were hard to find, the staff had to be built around a small number of experienced men, supplemented by recent graduates. At one time this staff totaled 57.

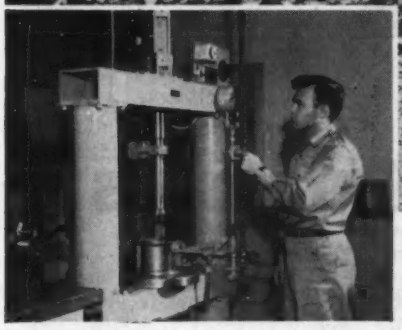
• **Leader**—Grant County—at the north end of the project where the first irrigation development was scheduled—was forced into the position of leadership in the road program, Dodson declares. Before the work was started the county's existing road system included about 1,900 miles of largely unimproved dirt roads which had been serving a dry land farm area. The deluge of vehicles and construction machinery mobilized to construct the irrigation system caused rapid deterioration of the lightly-surfaced existing roads.

"Something had to be done quickly if the development was to go forward as scheduled," Dodson points out. "It was a huge task for poor, sparsely-populated Grant County."

Grant County started out the program in 1951 by letting a few minor road contracts. About 150 miles of roads were completed in 1952, 150 in 1953 and the 1954 figure is expected to hit 116 miles. Another 116 miles are expected to be completed in 1955 and 67 miles a year for each of the four succeeding years.

"Our plan was to make the money go just as far as possible," Dodson says, "making such good use of the funds that upon their exhaustion new money would be provided. This meant that not only were we engaging in a race against time, but also every action had to be carefully weighed as to its effect on future financial support."

BITUMULS® assures high-quality in-place mixes



WHEN you're working with native or in-place material and you get a thoroughly-coated mix like this rolling off the blade, it's no accident. There's a reason for it, and that reason is *Research*.

Road-builders are always confronted with the problem of making their materials, methods and equipment fit each job. Many years ago we faced the fact that, as far as asphaltic binders were concerned, the Road-builder's problems were our problems. It was then that we turned to *Research* for the answers.

Today, we maintain the most extensive research program in the industry. Over the years have come such developments as Bitumuls for use with "hard-to-coat" native aggregates; Bitumuls for use with damp or wet aggregates; Bitumuls for use in damp or inclement weather. Each new development has been designed to assure fast and thorough coating of aggregates to produce a high-quality mix with uniform drying characteristics.

Bitumuls—emulsified asphalt for cold-application—is available in Mixing Grades as well as in grades designed for Surface Treatment and Penetration work. Full technical information on all grades is available from Bitumuls Engineers who work out of offices from coast to coast. In addition, illustrated booklets containing data on Bitumuls application are available without obligation.

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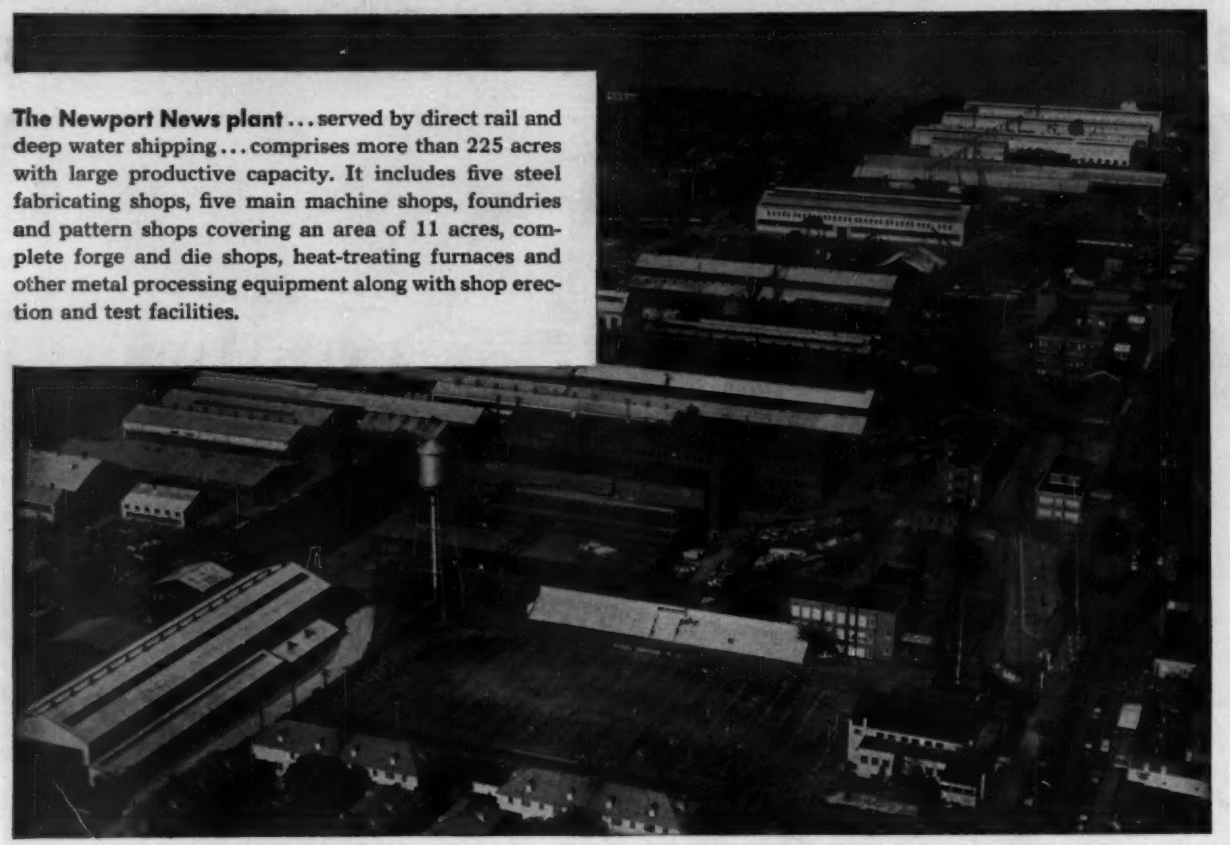

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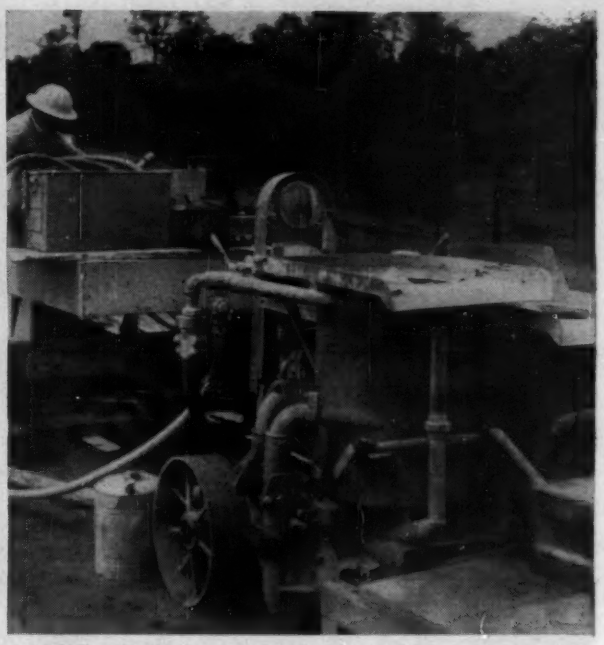
GROUT MIXER can produce batch of low water-cement ratio grout in 15 seconds.



GROUT PUMP of conventional style (left) moves the mixture. Grout mixer (right) has two chambers.

Mixing Machine Speeds Folsom Dam Grouting

Cement slurry mixers modified to produce neat cement grout have facilitated foundation grouting at Folsom Dam and its auxiliary structures. The English-made units—Colcrete mixers—are a type relatively new to the U. S. Good wetting action and fast mixing time of the machines have sped the work.

The machine has been used extensively in Europe in mixing a sand-cement grout for pumping into preplaced aggregate. It has two mixing chambers. Cement and water are usually mixed in one tank, then pumped into the second tank where the sand is added. The mixers have a centrifugal action of the colloidal mill type that thoroughly wets particles to minimize segregation during handling.

Two of the units were purchased by the Corps of Engineers after extensive tests. The units were modified to make them more suitable for mixing a neat cement grout. Controls were changed so that the two mixing tanks could be operated together or separately. Capacity of the smaller mixing tank was increased to make the two equal. A metered water system was added to serve either tank. And the tops of the mixing chambers were turned to face the rear so a single workman can charge cement into them. With these modifications, the machines are capable of mixing up to 300 sacks per hour of neat cement grout.

Because the thorough wetting of the cement particles permits less grout segregation, it is believed that more grout has been placed in finer rock seams at Folsom than would have been possible through use of a conventional mixer. Further, the 15-second mixing time is considerably less than needed by conventional equipment—particularly when a low water-cement ratio such as 0.6 and 0.5 is used. And the machine can be cleaned by pumping only 6 to 8 cu ft of water through it.

Two grouting contractors have worked on the Folsom project using grout mixers supplied by the Corps of Engineers. Selby Drilling Corp. has the contract for grouting through the fill at Mormon Island Auxiliary Dam—an earthfill structure, 4,820 ft long with 110-ft maximum height. Continental Drilling Co. is grouting the foundation of the main dam—a 340-ft high, 1,400-ft long concrete gravity structure.

Folsom Dam is a multiple purpose project located on the American River 24 miles northeast of Sacramento, Calif. It is a project of the Sacramento District, Corps of Engineers, Col. Wm. J. Ely, district engineer. Bruce E. Clark, geologist, has supervised the grouting work for the Sacramento District.

GROUT IS INJECTED through the fill in the conventional manner. Drill tower in background drills holes in advance of grout mixing and pumping equipment.

Clyde Whirley does hook work at Sandy Hook

WORKHORSE ON THE HOUSATONIC
is this Clyde Whirley at work on the Connecticut Light and Power Company's dam at Sandy Hook.

Clyde now offers a new line of Whirleys that offer the ultimate in safety, efficiency and ease of handling. Starting with the hoist, you'll find a unit specially designed for Whirley service. Drums are narrow to assure a better cable spooling. This permits the entire hoist to be narrowed so that, except on the largest size, the machinery cab can be shipped intact with the machinery in place . . . a feature that substantially reduces erection time and costs.

Ball and roller bearings on all shafts and drums minimize maintenance and reduce friction, thus effecting additional economy in power savings.

Air operated band friction clutches, brakes and boom drum pawl give smooth, positive and safe load control at all times, with no effort on the part of the operator.

The rail circle is supported at every point by main side beams and diagonal beams of the rigid turntable. Wide flange, uncut beams with box-section cross girts and diagonal bracing form the rotating frame which supports the A-frames, boom and machinery cab.

The rotating frame turns on equalized wheel carriages which permit definite determination of actual wheel loads. The tapered wheels allow true rolling on the rail circle with no slippage.

It will pay you to carefully consider these and all other cost-cutting, profit-boosting 'Quality-Plus' features of the new line of Clyde Whirleys. Without obligation you are invited to consult our engineering department relative to your particular needs.

If you haven't received a copy of the new Whirley Bulletin N-12, let us know. We'll be happy to send one to you.

HOISTS—DERRICKS—WHIRLEYS—BUILDERS TOWERS—CAR PULLERS—HANDI-CRANES—ROLLERS

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BARIUM STEEL CORPORATION

How Soon for Mica Creek?

A $250-million project, to be built in Canada by private U. S. utility companies is on the boards—Here's an interview-report on how it stands, who's behind it.

In the 15 months since the Administration's "partnership" power policy was enunciated, (ENR Sept. 16, 1954, p. 26, July 15, 1954, p. 21) no projects have been undertaken. In the opinion of many, work will have to get underway soon in the Pacific Northwest or a power shortage will overtake that region by about 1960.

The Puget Sound Utilities Council, sponsor of the huge Mica Creek project on the Columbia River in Canada, appears to be as near to getting work underway as any agency. PSUC's Consulting Engineer, Jack D. Stevens, here reports on the status of the council's work:

What is the Puget Sound Utilities Council?

The council comprises five operating utilities in the Puget Sound-Cascade area in the State of Washington: Seattle City Light, Tacoma City Light, Puget Sound Power & Light Company, Snohomish County Public Utility District No. 1 and Chelan County Public Utility District No. 1.

These utilities operate 19 hydroelectric and five steam-electric plants with a total capacity of 1,600,000 kw, and also purchase power from the federal government under long-term firm power contracts.

Total utility assets are over one-half billion dollars and total gross annual income is about $65 million. Compared with other parts of the country, total revenues are lower in relation to total sales because the average power rate is lower in the Puget Sound-Cascade area. The five utilities serve over one-half million customers and have a combined peak load of about 1,500,000 kw in a load area embracing 60% of the population of the state and 64% of the industry. That's a thumbnail description.

What are the general objectives?

Briefly, the utilities agree that it is their responsibility to supply the total electric power needs of the Puget Sound-Cascade area for all purposes, including industrial growth, and they have declared their intention of doing so.

The utilities recognize the mutual advantages, savings and benefits to be obtained from joint planning, development and operation of power resources. They are working together to assure the area adequate electric power supplies at the lowest possible cost to the consumer.

How did you become associated with the council?

The council utilities recognized that one of the first steps in developing new power supplies is the employment of an engineer. They wanted a man with a utility background who could set up the program and provide the technical guidance to keep it rolling. I was selected for the job.

How long have you been associated with the electric utility business?

Quite a few years.

After completing my education in Oregon, I worked for one of the large utilities in California and went from there by way of engineering firms, contractors and private practice, to the Bonneville Power Administration, just prior to coming with the council. At B.P.A. I was in charge of hydraulic operations of the U. S. Columbia River System and power project planning.

What is the nature of the council's power program?

We now have nine hydro projects under investigation. These plants would add 1,700,000 kw of new capacity and 1,400,000 acre-ft of usable storage. Investigations will prove some of these projects to be infeasible, but a considerable number will be constructed. In addition, we are proposing to construct a $250-million dam on the Columbia River in British Columbia. This major dam would be located at the Mica Creek site about 200 mi north of the International Boundary.

Just how big is Mica Creek dam?

Tremendous. The dam will be a rock-fill structure about 700 ft above foundation—the largest dam of this type in the world. The reservoir will provide 10,500,000 acre-ft of usable storage for use through 940 ft of head at sites in British Columbia and 777 ft of head at projects which are now existing or under construction on the lower Columbia River in the U. S.

Four additional dams now under consideration will increase the latter figure to 1,171 ft.

What are these plants and how much additional power will be produced?

About 900,000 kw of prime power will be produced at the Mica Creek dam and 800,000 kw at the downstream Downie Creek and Little Dalles sites.

This represents a total of 1,700,000 kw of prime power to be produced in British Columbia. About 1,200,000 kw of prime will be produced from Mica Creek storage at Grand Coulee,

(*Continued on page 50*)

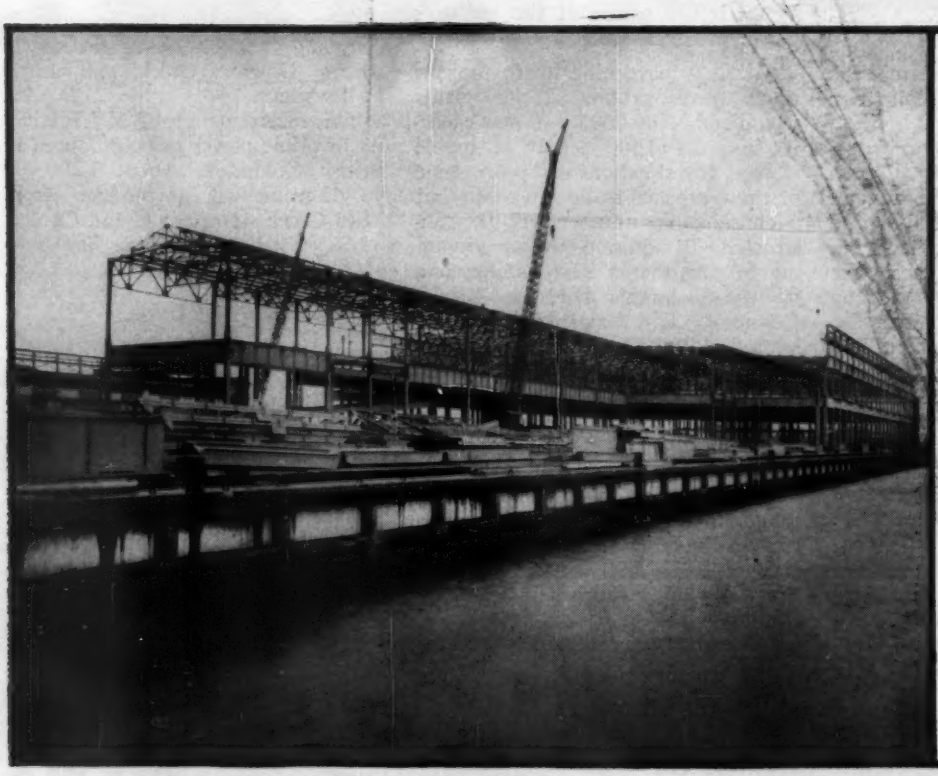
HERE—up above the U. S.-Canadian border—is where the big dam would go. Jack D. Stevens, consulting engineer in planning stages, is using the pointer.

IT'LL BE A TREMENDOUS JOB—producing eventually 1,700,000 kw of prime power at the main dam and at four downstream structures.

KEEPING ACCIDENTS DO

1

Supervised safety planning gets "repeat business" for this firm of general contractors. This is a new Sewage Treatment Plant.



3

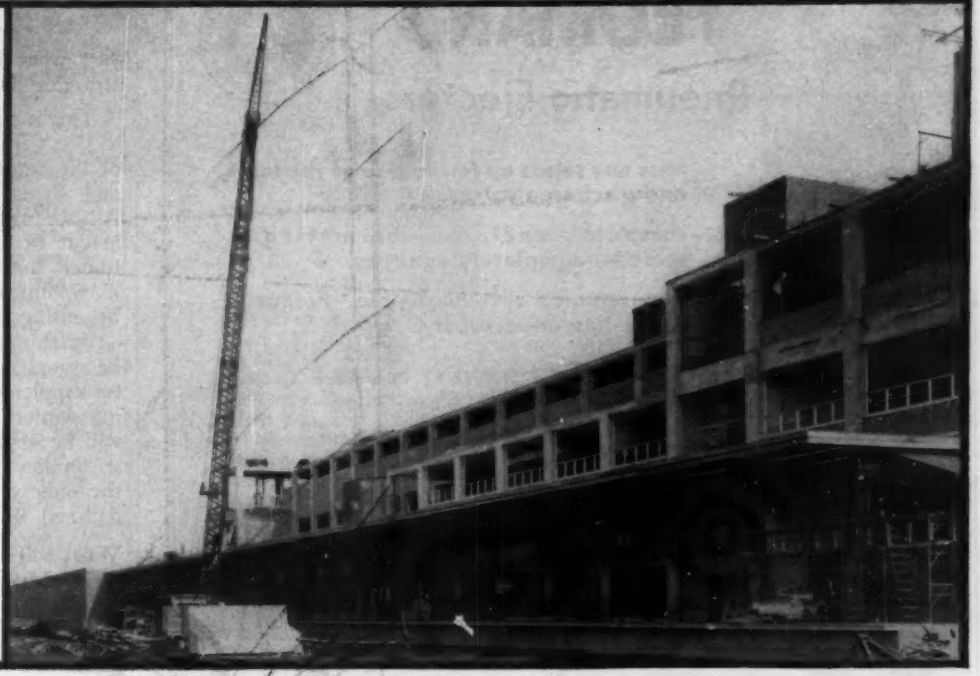
6,000 tons of steel are handled carefully and skillfully by the Hughes-Foulkrod Company in building this pier for the city of Philadelphia.

WN IN QUAKER TOWN!

(A brief case) by Mr. Friendly

(2)

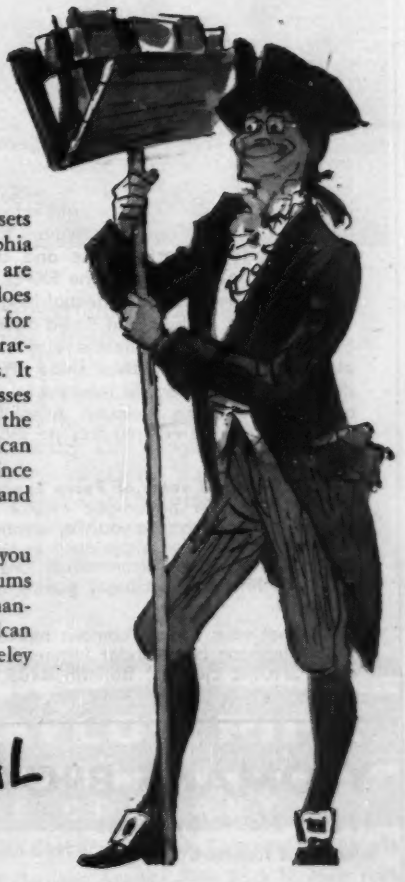
16 acres under one roof with 700,000 sq. ft. of floor space. The job was done for American Stores in Philadelphia. Safety planning trimmed time and costs.



MORAL: *Cement and bricks and steel beams can*
Dent and damage the average man
And accidents hurt even worse
When they hit you in the purse!

An outstanding record for safety is one of the big assets that helps the Hughes-Foulkrod Company of Philadelphia keep its many important customers. Most of its jobs are "repeat business." This firm of general contractors does institutional, industrial, railroad and municipal work for many of the outstanding concerns of the country, operating throughout the eastern half of the United States. It owns all of its construction equipment. Top management stresses safety and makes a policy of keeping job volume within the capacity of executives to give personal supervision. American Mutual Safety Engineers have worked with this top firm since 1933, have helped it cut accidents and operating costs and achieve its enviable reputation for safety.

If you are interested in a personal-type service that can help you reduce accidents and produce substantial savings in premiums and operating costs, write today for your free copy of "Foremanship and Accident Prevention in Construction" to: American Mutual Liability Insurance Company, Dept. O-133, 142 Berkeley Street, Boston 16, Mass.



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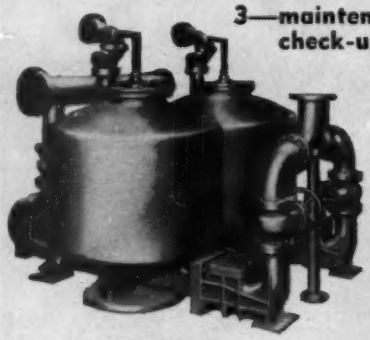
1—pass any solids up to the size of the inlet and discharge valves.

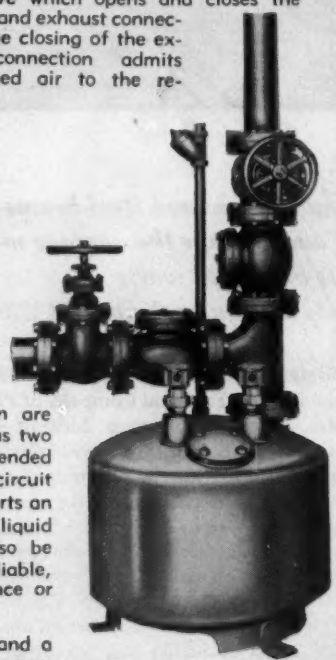
2—completely enclosed—hermetically sealed—completely sanitary.

3—maintenance cost negligible. Frequent check-ups unnecessary.



- **The SHONE(R) Pneumatic Ejector** is recommended for capacities up to 1,000 g.p.m. and heads to 50 ft. It is a simple, sturdy, mechanically-controlled unit consisting of a closed receiver or pot with check valves on the inlet and discharge; a pilot slide valve actuated by two open cast iron bells suspended in the receiver; and a piston valve controlled by the pilot slide valve which opens and closes the pressure and exhaust connections. The closing of the exhaust connection admits compressed air to the receiver and forces the contents out through the discharge check valve and discharge charge pipe.

Action is positive; there are no internal parts to restrict flow; the sturdy, simple parts are few and do not move fast or far; there is practically no wear, and the pump is always ready for quiet, efficient service.



The EXPELSOR Pneumatic Ejector for small volume removal of solids-carry liquids in capacities up to 100 g.p.m. and larger, heads to 35 ft. Suitable for building and industrial plant waste, and medium-to-small sewage systems. Performance and operation are similar to the SHONE, but the EXPELSOR has two rigid metal electrodes of unequal length suspended in the receiver. The rising liquid closes the circuit between them and energizes a relay which starts an air compressor. Compressor shuts off when liquid drops below the longest electrode. May also be operated by steam pressure. Absolutely reliable, positive, trouble-free; requires no maintenance or attention.

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Contact your Local Yeomans representative listed in the Yellow Pages of your telephone book under "Pumps" or write direct to factory for Bulletin 4005 SHONE Ejectors; Bulletin 4405, the EXPELSOR.

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Chief Joseph, Rock Island, McNary, The Dalles and Bonneville. All of these projects are existing or presently under construction. Four additional projects under consideration are the Wells, Rocky Reach, Priest Rapids and John Day which, if constructed, will add 700,000 kw of prime power.

Just what is your proposal for constructing Mica Creek dam?

This is our proposal:

We will pay for the construction of the $250-million Mica Creek dam and British Columbia will own it. All we ask is that the 10,500,000 acre-ft of usable storage be released under schedules that will produce maximum total prime power from all benefiting plants.

By this procedure, flood flows will be stored in the summer and released to supplement low streamflows during winter months. Storage releases will be made in relation to load and streamflow patterns which are much the same on both sides of the International Boundary.

What will all this mean to the people of British Columbia?

Well, to begin with, they will get a $250-million dam. We will pay for it and they will own it.

No doubt they will wish to install generating facilities at the dam and build the downstream Downie Creek and Little Dallas projects. But they'll obtain a large block of prime power at Mica Creek at a fraction of the normal costs—the major cost of the project is in the dam and the Canadians will only be paying for the power facilities—so they will have exceptionally low cost power.

Power production at the two lower sites will also be low since it will include benefits from 10,500,000 acre-ft of upstream storage. A total of 1,700,000 million kw of prime power will attract large industries such as light metals and chemicals. New developments could include electro-processing of Canadian titanium ore, and petrochemicals associated with the country's petroleum resources. Briefly, the Mica Creek development will mean abundant low-cost electric power which will bring new industries, employment, and associated benefits.

How will council utilities get any power out of the deal?

Our share of power will come from the 1,200,000 kw of additional prime to be generated at U. S. Government plants as a result of storage releases at Mica Creek. We ask only that we receive an amount of prime power equal in value to our annual cost for constructing the dam.

In other words, we are asking the

government to deliver to us each year an amount of prime power equal to our annual cost, divided by the rate for government firm power at 100% load factor. The balance of the 1,200,000 kw of prime power will go to the government in payment for generating the power.

Will the U. S. government have to install additional generators at its plants?

Yes, at some of them.

A third powerhouse will be required at Grand Coulee. This new plant will have an installation of 720,000 kw and will cost about $98 million. Also two additional generators will be required at Chief Joseph and two at The Dalles. These four units will cost about $23 million.

Will the arrangements with British Columbia require new legislation?

We don't think so. There are no international boundary situations such as the St. Lawrence Seaway, or the Libby project in Montana where a dam in the United States will back water into Canada. Our legal staff is working with lawyers in British Columbia on this and related matters.

Is the Mica Creek project different in any important manner from storage projects in the United States?

Yes—particularly with regard to conflicts with other interests. The Mica Creek reservoir will not flood towns, railroads, mining properties or tillable lands. It has no fish or wildlife problems. There are no International Boundary problems and no controversy as to who will own the dam after it is constructed.

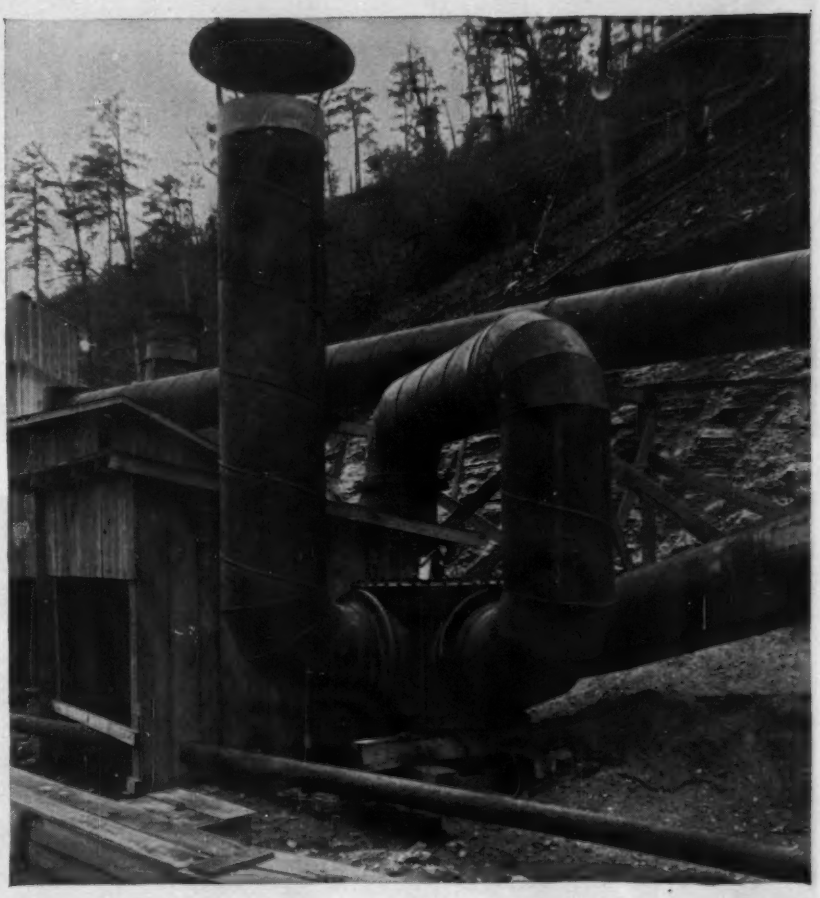
Do you have any definite commitments from the Canadians?

We have no firm commitments from the Canadians but we do have their assurance that they are intensely interested in our proposal and that they will cooperate fully in exploring its possibilities. This is quite a project and we all want to be sure of our facts. We are now exchanging technical data and legal opinions.

What other power potentials is the council studying?

We are negotiating a contract with the Atomic Energy Commission for the purpose of setting up a group of engineers to study nuclear reactor processes and their application to power production in the Pacific Northwest. We feel that ultimately nuclear power will be competitive with Northwest hydro and we want to be prepared to construct and operate that type of plant. In the meantime, we will be training a specialized staff.

MAN-MADE WEATHER for UNDERGROUND SERVICE



There's nothing more vital in underground construction than a dependable method for supplying fresh air and eliminating stale air, gases, fumes and dusts. That's where Naylor lightweight pipe comes in, providing the most dependable system for push-pull ventilation. Its light weight makes it easy to handle and install, particularly with the Naylor one-piece Wedge-Lock coupling to speed connection. Extra collapse strength and safety are assured through Naylor's exclusive lock-seamed spiralwelded structure which permits the use of lighter gauge steel without sacrificing strength. For full details on this outstanding pipe and coupling combination, write for Bulletins No. 507 and No. 514.

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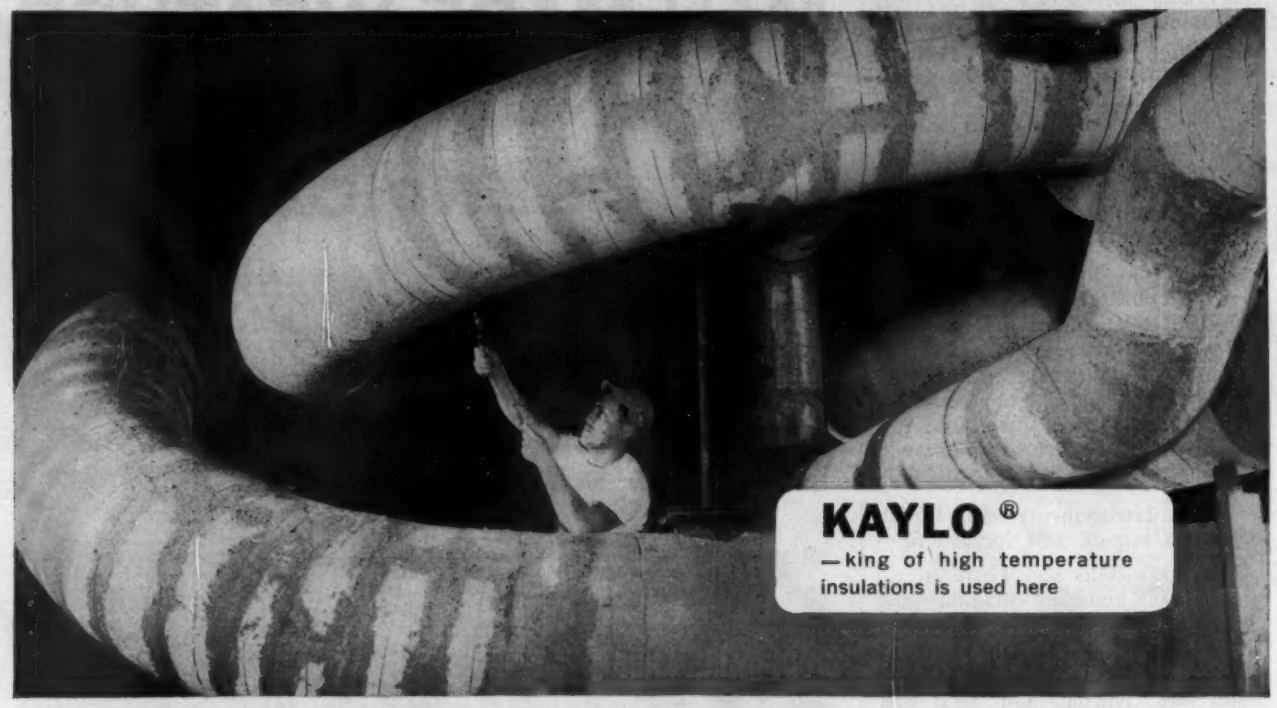

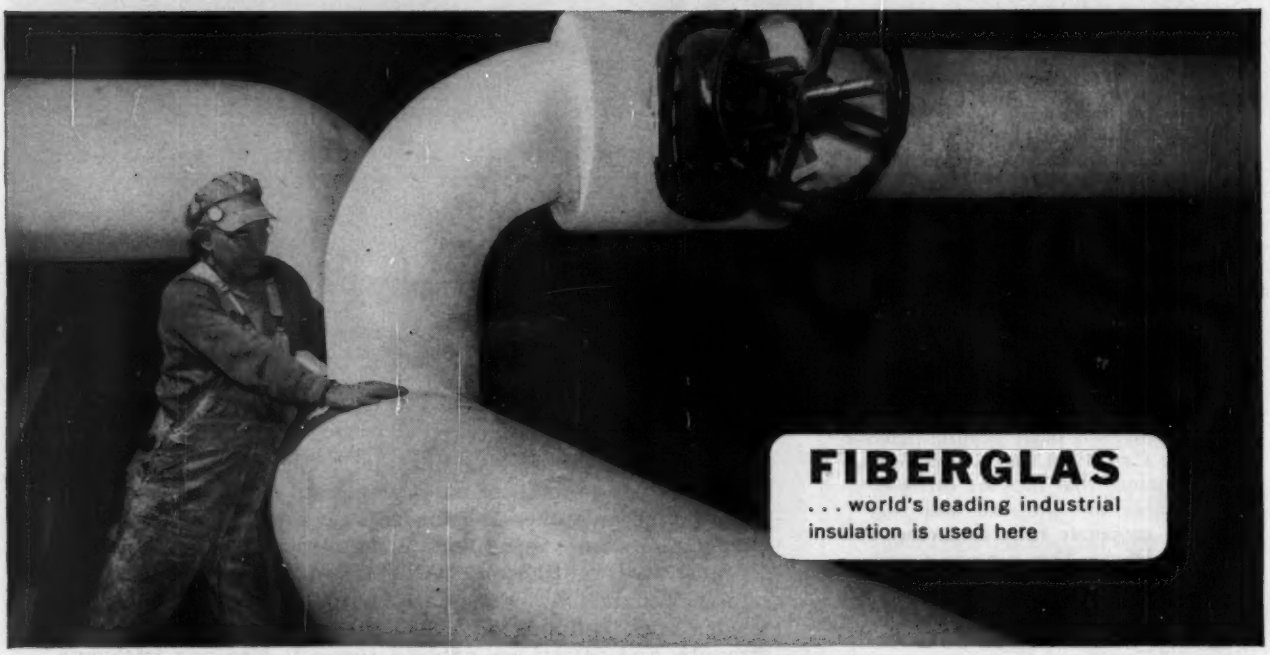

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WITHOUT dust collection equipment, silicosis-producing dust is free to escape into atmosphere and workers' lungs.

WITH exhaust system the dust is safely removed to hoppers in the machine to be emptied later into bags and buried.

Dustless Drilling: It's Faster, Cheaper, Safer

Within the space of a few miles on the western shore of the Hudson River, two rock drilling jobs are in progress simultaneously. One, in New Jersey, is marked by a low-lying column of dirty white dust. The air around the other in New York—on the Berlanti Construction Co.'s portion of the Thruway Project—is completely dust-free. The difference is made by a newly-designed rock dust collector that, besides being an approved method in New York for the prevention of silicosis, has shown by tests that it can help produce greater drilling footage with less sharpening of drill steel and consequently longer tool life.

The new machines are redesigned versions of those developed more than two decades ago by G. S. Kelly and G. J. Atwell (ENR March 1, 1934, p. 284). The basic principles have been maintained, but the modern versions have shorter wheelbases for greater maneuverability and lower heights for greater stability. New hopper-type bins make for easier discharge of accumulated material and an external shaker handle eases de-dusting of the filter bags. Also, a new type blower is used for more efficiency.

In principle, the dust collection machine is nothing more than an oversized vacuum cleaner, but the similarity ends with the principle. Starting at the hole, a protective hood around the drill steel shields the area for the accumulation of drilled rock dust and chips. From here it is sucked through hoses to the machine.

(*Continued on page 54*)

THESE COLLECTORS, flanking compressor, each handle dust from two drills. They are emptied through three outlets; one at front, two at sides of the machine.

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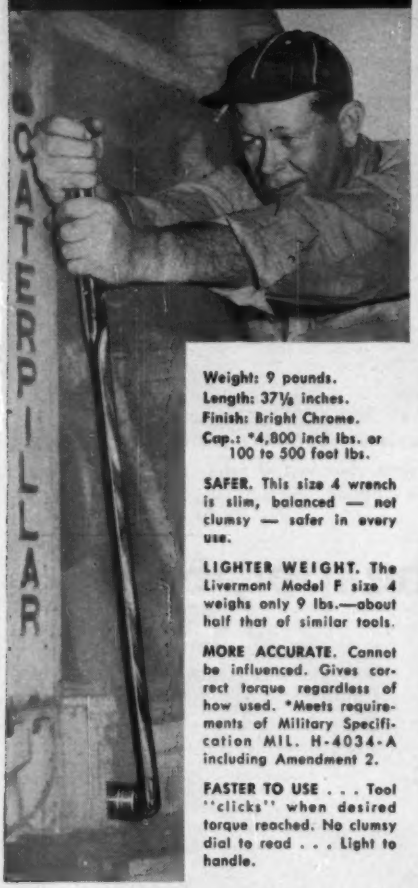

Weight: 9 pounds.
Length: 37⅛ inches.
Finish: Bright Chrome.
Cap.: *4,800 inch lbs. or 100 to 500 foot lbs.

SAFER. This size 4 wrench is slim, balanced — not clumsy — safer in every use.

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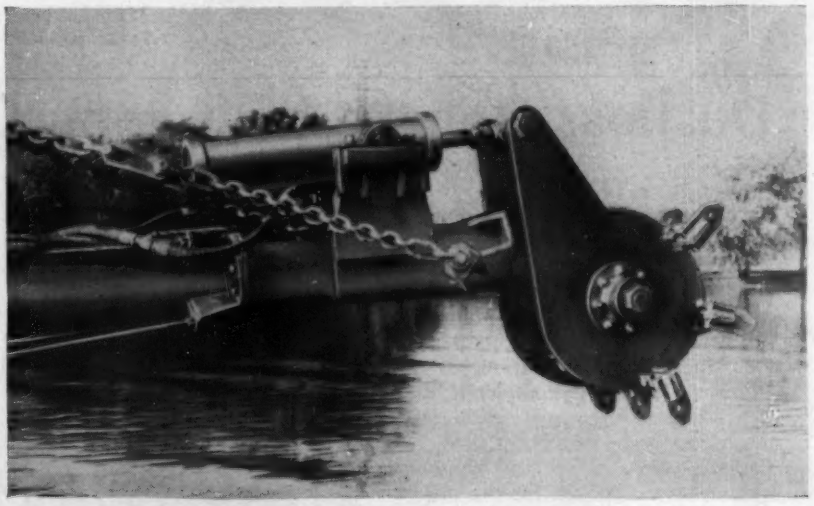
MANIFOLD connects leader with drill hose. Special hood is shown in foreground.

The machine is divided into two compartments. In the first, the velocity of the rock particles is slowed through a cyclone allowing heavier chips—which comprise about 98% of the total volume—to drop into an accumulator hopper. The particles that remain suspended enter the second compartment through two ducts at the top of the dividing partition.

Filtration in the second compartment is accomplished by a series of filter bags. Effectiveness of these filters is reported to be such that only particles measuring less than two microns in diameter are passed—some particles in cigarette smoke are larger than this.

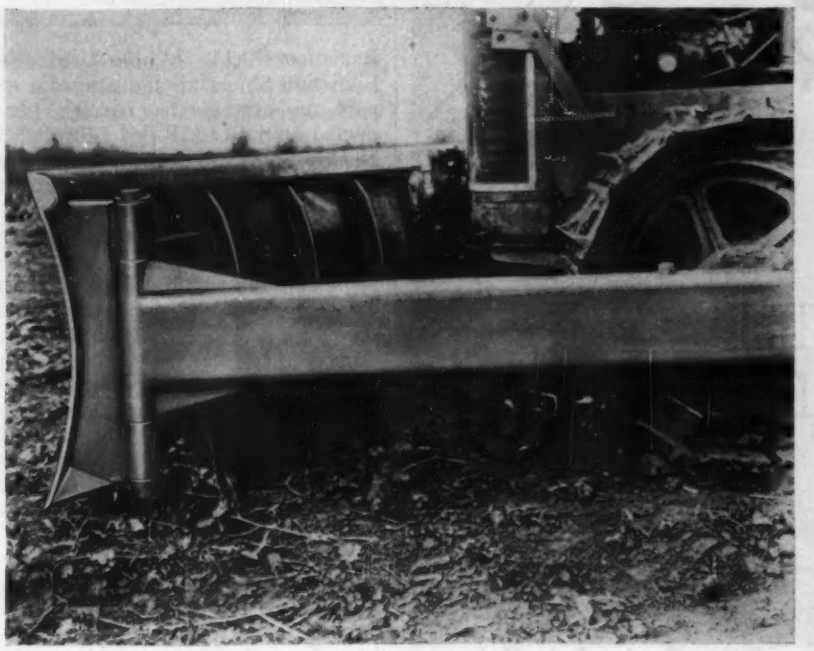
Power to drive the blower is supplied through V-belts from either gasoline or diesel engines or electric motors; individual horsepower is dependent on the size of the machine. The smallest of the dust collectors will control rock dust from two jack hammers or one wagon drill; the next size is adequate for four jack hammers or two wagon drills; while the largest size is built for use with 12 jack hammers or six wagon drills. Effective working range from hole to collector varies from 400 to 450 ft.

All sizes of the dust units have sufficient storage capacity for four hours of continuous operation. To unload, caps are removed from the hopper outlets and the accumulated material fed into paper bags. The shaker handle is oscillated at this time to clear the filter bags. KADCO CORP., 36-40 11TH ST., LONG ISLAND CITY 6, N. Y.



Agitator Aids Suction Dredge Action

A suction dredge agitator has been designed to increase dredging output, reduce down-time due to clogging of the nozzle and lower overall dredging costs. Known as the Agipeller, the device consists of an oscillating agitator activated by hydraulic power from the deck of the dredge. It eliminates the heavy weights, long shafting, bearings, couplings, chains and pins associated with conventional ladders. Rows of manganese steel teeth sweep back and forth in front of the suction nozzle, cutting and loosening compacted deposits, pushing aside large objects to keep the nozzle clear. Should tramp iron or other obstruction become wedged in the nozzle, the Agipeller automatically reverses itself to avoid damage. The Agipeller is recommended specifically for sand and gravel deposits which do not "cave" readily, or in loose deposits containing a large number of oversized stones that clog plain suction nozzles and their dredge pumps. The hydraulic pump of the power unit may be either directly connected to a motor, or run off a jack by V-belt drive. W. H. Pfarrer Co., 211 W. Wacker Dr., Chicago, Ill.



Angle Dozer Has New Hinge Mounting

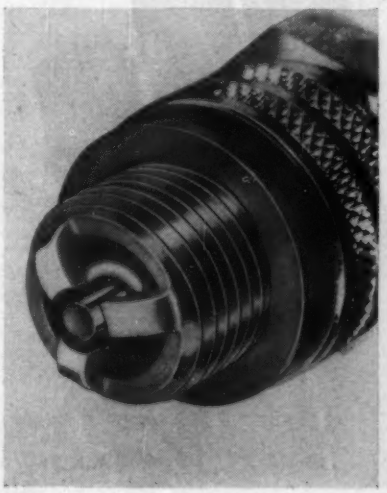
A new angle dozer is designed to eliminate the excessive overhang and weight of the older horseshoe construction and improve maneuverability. Using a more compact twin-corner-hinge system of blade attachment, the new dozer construction permits the blade to be anchored much nearer the crawler, thereby affording greater ease of control and blade effectiveness, it is claimed. In addition, the unit can be converted to tool-bar use, involving any pull-behind operation, by removing the dozer blade and turning the push-arms to the rear. The dozer uses twin, 4-in. two-way cylinders, front-mounted pump and a heavy-duty industrial valve with float position. It fits International-Harvester TD-6, TD-9, TD-14; Caterpillar D-2, D-4, D-6; Allis-Chalmers HD-5 and Oliver A, B, and D. Teale & Co., 1417 N. 57th St., Omaha.

Triple Electrode Spark Plug Said to Cut Fuel Consumption

A triple electrode spark plug with concave ground electrodes has been developed for use in gasoline powered construction equipment. It is claimed that Auburn TC-3 can be used in all automotive engines to gain four definite advantages: lower fuel consumption, more power, less plug fouling and easy cleaning. In addition to triple electrodes, the TC-3 also adapts the solid copper gasket and 95% aluminum oxide insulator used in jet engine plugs.

The three gaps are factory set. If one electrode burns or erodes away beyond the most efficient gap setting, it is said that the other two remain properly set to make sure of complete combustion and plug life is thereby doubled. Turbulence of the fuel mixture around the three electrodes and through the open gaps allegedly minimizes lead fouling and cools the nose of the plug.

In field tests of the plug made by operators, fuel savings up to 40 per cent have been reported along with increased acceleration and power. The Auburn TC-3 is manufactured in sizes to fit all gasoline engines. Auburn Spark Plug Co., Auburn 3, N. Y.



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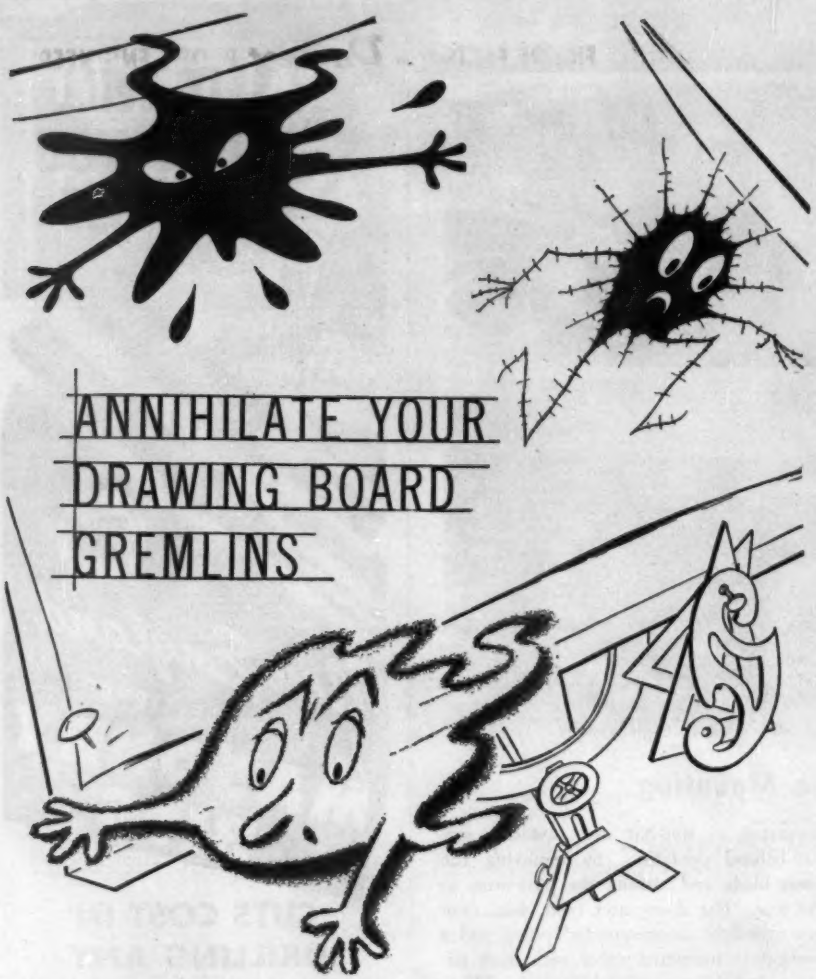

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PUBLICATIONS

Radiation shield—"Marble Used as a Radiation Shield" is the title of a report on experiments recently conducted at the Oak Ridge Institute of Nuclear Studies to determine the most effective and most economical protection against high voltage radiations. Twenty-six diagrams, charts and illustrations dominate this 32-page book to provide the architectural profession with a summary of the problems involved in, and the results obtained by using various methods and materials for shielding. Diagrams, room protection charts and tables show the shielding qualities of various thicknesses of marble at points 3 ft, 7½ ft, and 12 ft from source of radiation. MARBLE INSTITUTE OF AMERICA, 108 FORSTER AVE., MT. VERNON, N. Y.

Scaffolding—The Brainard scaffolding system is described in a new 12-page bulletin recently released. The bulletin shows the principle of assembly, using a patented slip-fit arrangement that eliminates nuts, bolts, pins, or tools. Various applications are illustrated. BRAINARD STEEL DIV., GRISWOLD ST., WARREN, OHIO.

Maple flooring—A research report entitled "Controlling Expansion of Hard Maple Floors," is designed to provide architects and builders with data that will give a better understanding of important factors influencing the stability and general serviceability of hard maple floors. The information, developed through extensive research conducted for the Association in the Timber Engineering Co. laboratory shows how to control expansion of hard maple floors and allowances to be made for expansion. Emphasis is placed on the importance of proper nailing. Single copies of the illustrated 8-page report are available upon request. MAPLE FLOORING MFRS. ASSN., SUITE 548; PURE OIL BLDG., CHICAGO 1, ILL.

Hack saw blades—A small booklet of 30 pages describes the proper technique for selecting and using hack saw blades. The booklet is divided into four parts including an introduction and information on hand blades, light power blades and heavy power blades. A brief section gives the advantages of using eclipse blades. JAMES NEILL & CO. LTD., 44 WHITEHALL ST., NEW YORK 4, N. Y.

Street lighting—Technical data on lamps for street and highway lighting is given in a new 8-page booklet. De-

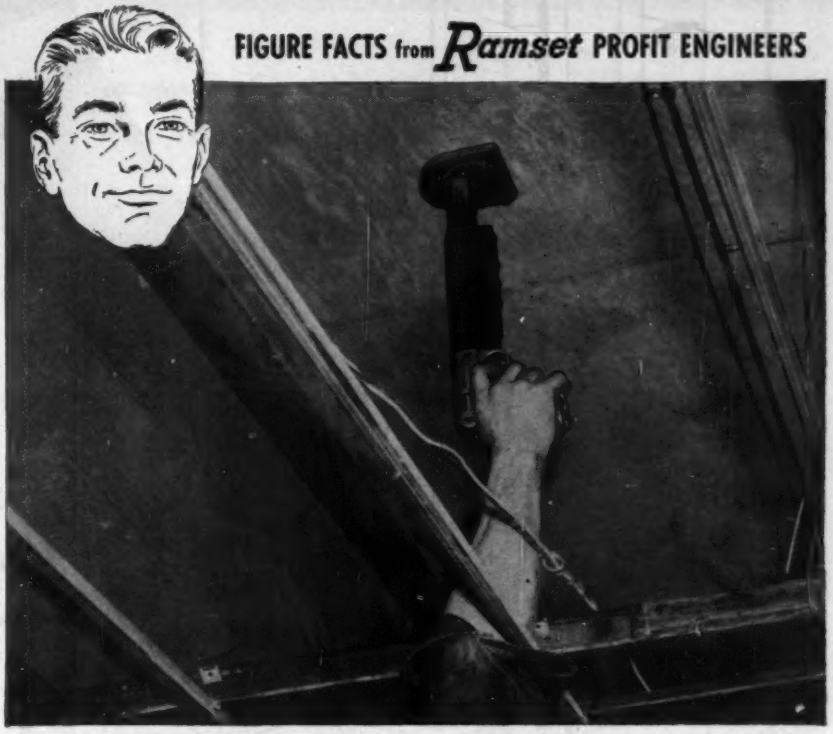
signed as a selection guide, the booklet gives information on all lamps in common use as well as others recommended for this type of service. Four charts present data on mercury lamps, and series and multiple type lamps, both for standard service and group replacement. The data include such information as mean lumens, lumens per watt, initial lumens, and physical dimensions. A graph of typical lumen maintenance curves for series and multiple type lamps is also presented. Booklet S-413. LAMP DIVISION, WESTINGHOUSE ELEC. CORP., MACARTHUR AVE., BLOOMFIELD, N. J.

Product catalog—The "Quick Reference Guide" is an illustrated 24-page booklet of interest to those concerned with problems of building maintenance and construction. A number of Tremco products are described and various maintenance problems of roofs, floors, sash, masonry preservation, etc., are discussed. More than 50 photographs and drawings illustrate a range of topics such as flashing and coping repair, installation of mastic flooring, caulking and pointing, glazing and painting. THE TREMCO MFG. CO., 8701 KINSMAN RD., CLEVELAND 4, OHIO.

Lightweight concrete — "Permalite Concrete Roof Deck Specification Manual" is the title of a working handbook on lightweight insulating fireproof concrete for roof deck construction. The Manual contains 218 pages and is divided into two sections—structural and non-structural. Tables have been worked out in detail so that an architect planning to use a certain type of construction, on a given joist spacing, with a particular type of ceiling below, has only to turn to the proper table and find, already worked out, the slab thickness required with different Permalite concrete mix ratios, the strength and the K or U factors for the whole roof ceiling combination. A division gives subpurlin details and load tables to supplement other material in a section on insulating roof fill. GREAT LAKES CARBON CORP., PERLITE DIV., 612 S. FLOWER ST., LOS ANGELES 17, CALIF.

Power take-off—A new power take-off drive is described in Bulletin No. 542. This drive, consisting of a 1¼-in. flexible shaft in combination with a square telescopic rod and tube, does away with power couplers. It is being used on dump trailers. STOW MFG. CO., 906 SHEAR ST., BINGHAMTON, N. Y.

FIGURE FACTS from *Ramset* PROFIT ENGINEERS



PROFIT ENGINEERING HELPS JOHNS-MANVILLE SAVE 103 DAYS...ADDS $2,400 PROFIT MARGIN

To install acoustical ceilings and walls for the Ohio Oil Company at Findlay, Ohio, required setting 11,000 eye pins in concrete. Johns-Manville used RAMSET SYSTEM, at the rate of 100 fastenings per hour, instead of 12 with old-fashioned methods. Result — costs were reduced by $2,400 and the work completed far faster than originally anticipated.

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Education Society Elects Prof. William L. Collins

William L. Collins, engineering professor at the University of Illinois, has been elected executive secretary of the American Society for Engineering Education. He succeeds Arthur Brownell, recently resigned from Northwestern University to become president of Worcester Polytechnic Institute.

Professor Collins graduated from the University of Illinois and holds both a bachelor's and master's degree in civil engineering. He has been on the faculty since 1929 and teaches theoretical and applied mechanics.

As a result of his appointment, ASEE's central office is being moved to the Illinois campus. The society, organized in 1893, now has a membership of 8,000.

Public Works Directorship Changes Hands in Ohio

Zoyd M. Flaler, a veteran of Ohio state engineering work, last week became public works director. He was appointed by Gov. Lausche to succeed Clyde L. Moyer, who retired after 45 years of public service.

This is Moyer's second retirement. In 1949, he left the highway department with which he had been for 33 years, serving as division engineer of bridges and planning engineer. Shortly afterwards, he was named to the Reclamation Board of Review and in 1952 took over the public works directorship.

Flaler, a graduate of Wayne Business College and a civil engineering graduate of Tri-State College, was formerly chief of the reclamation division. Earlier in his career he was a construction engineer for General Electric, Mercer County engineer, and service director and city engineer for Coldwater, Ohio.

George S. Bartlett Award Goes to J. A. Anderson

James A. Anderson, head of the Virginia Highway Department, was recipient of the George S. Bartlett Award at the annual meeting of the Highway Research Board in Washington last week. The award was set up in 1931 in honor of Mr. Bartlett, a pioneer in the development of better highways. Sponsors, in addition to the HRB, are the American Association of State Highway Officials and the American Road Builders Assn.

The Bartlett Plaque, highest award in the highway field, goes to Mr. Anderson in recognition of the road modernization program he has carried out in Virignia since he was named commissioner in 1941.

The Highway Research Board's annual award for the best technical paper at the previous annual meeting went to Claude A. Rothrock, an engineer of the State Road Commission of West Virginia. His paper, "Urban Congestion-Index Principles," was a discussion of the need for an objective method for measuring and evaluating traffic congestion.

Roy W. Crum Awards for distinguished service, set up in 1952 in honor of the late director of the Highway Research Board, went to three men this year: Burton W. Marsh, director of the traffic engineering and safety department of the American Automobile Assn.; Ralph Moyer, research engineer of the Institute of Transportation and Traffic Engineering at the University of California, and the late Walter H. Root, deputy chief engineer of the Iowa State Highway Department. Mr. Root was serving as chairman of the Highway Research Board at the time of his death last April. The other two have served the board in the same capacity in the past.

Men and Jobs Briefs . . .

• **Careers**—The Oklahoma Turnpike Authority promotes **W. D. Hoback** to chief engineer and manager—he succeeds **H. E. Bailey**, retiring manager who joins Deleuw Cather Co., Chicago . . . **Holden A. Evans, Jr.**, becomes general manager of the New York State Thruway Authority . . . **H. E. Lewis** is appointed chief highway engineer, Florida State Road Department . . . **Dwight P. Miller** is named chief of the Ohio division of Reclamation.

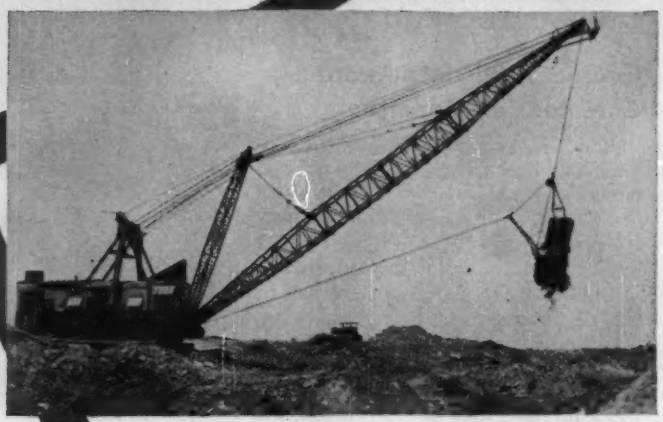
• **Associations**—New director of research of National Clay Pipe Research Corp. is **Albert J. Reed**, senior research engineer of The Carborundum Co. . . . **William Gillett** succeeds **E. C. Spratt** as president of the Producers' Council—he's president of Detroit Steel Products Co. . . . **Richard E. Heartz**, president of Shawinigan Engineering Co. Ltd., Montreal, is elected president of the Engineering Institute of Canada, succeeding **D. M. Stephens.**

• **Retirements**—After 32 years of government service, **Percy A. Sigler**, from the National Bureau of Standards where he specialized in flooring materials research . . . **Jeffrey A. Stone**, as manager of the Philadelphia office of Mahony-Troast Construction Co.—he'll continue in an advisory capacity.

Crane and Shovel Executive

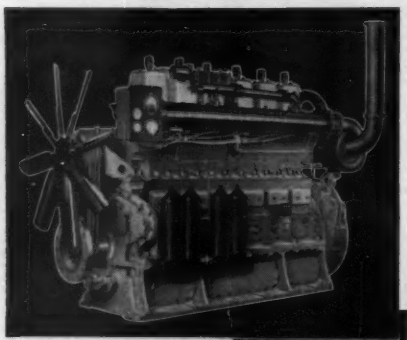
Walter W. Walb, president and general manager of American Steel Dredge Co., Inc., has been elected president of the Power Crane and Shovel Association. He succeeds Julian Steelman, president of Koehring Company, Milwaukee. The Wayne Crane Division of American Steel Dredge Co. is one of 15 members of the association, representing a large proportion of the shovel and crane industry's productive capacity.

EXTRA HP at lowest fuel cost!



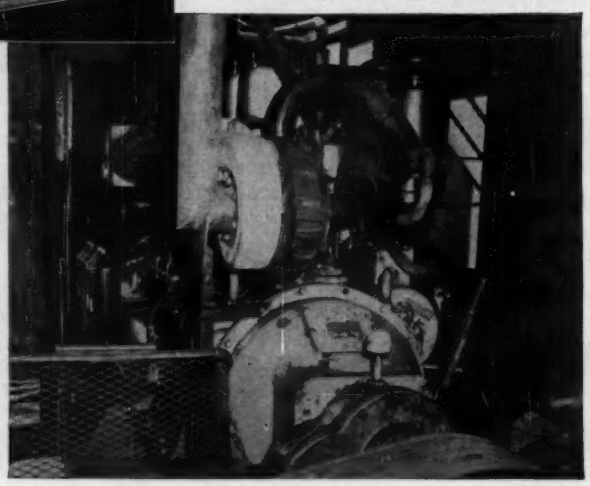
Penbrook Contracting Corp., Camp Hill, Pa., use this Waukesha Turbocharged 2894 cu. in. Diesel powered 5W Bucyrus-Monighan drag line with 6-yd. heavy-duty bucket and 125' boom for coal stripping and excavating.

turbocharged WAUKESHA Diesels



Mr. William E. Crum, President, Penbrook Contracting Corp. says: "One of the best engines we have ever owned." Outstanding characteristics of this big turbocharged Waukesha LRDBS Diesel are lively acceleration, clean burning, prompt starting, a tremendous reserve of power and great overall economy. Send for Bulletin 1606. 259

Turbo-Supercharged Waukesha LRDBS Diesel (*above and right*)—2894 cu. in., 8½-in. bore and stroke; develops 570 hp max. at 1200 rpm; burns all standard "high speed fuels"—powers drag line (top) owned by Penbrook Contracting Corp.



WAUKESHA ENGINES and POWER UNITS 10 hp to 1100 hp

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OBITUARIES

Alan M. Ferebee, 72, the engineer who was in charge of building the Marine Corps Air Station at Cherry Point, N. C., died in Morehead City, N. C., Jan. 1. He was formerly vice-president and director of the Foundation Co. (foreign) and district manager of the domestic company. Before retirement he was affiliated with the engineering firm of Carr & Greiner, of Durham, N. C., and Baltimore, Md.

Charles W. Donaldson, 66, construction superintendent with George A. Fuller Co., New York City, died Dec. 13 in Newark, N. J. Among the buildings he helped erect were the Polish Pavilion at the 1939 New York World's Fair and the Dodge Chicago plant.

Wallace C. Lyon, 91, former Treasury Department structural engineer who designed many of the big federal money vaults, died in Hyattsville, Md., Dec. 28. He designed vaults for the Bureau of Engraving and Printing, and Treasury Department.

Arthur L. Bush, 70, city engineer of Albany, N. Y., since 1946, died Dec. 31. He joined the New York state highway department in 1909, later served as senior assistant engineer and deputy superintendent in the Albany County highway department.

Arthur F. Hewitt, 71, former chief highway engineer for Colorado, died Dec. 4 in Denver. He joined the road department in 1929 and became chief engineer in 1944. Since leaving the chief's post he has been assistant bridge engineer for the department.

Horace V. Hubbell, 72, retired Bureau of Reclamation engineer, died Dec. 18 at Ft. Collins, Colo. One of his big jobs during 36 years bureau service was serving as engineer in charge of Angostura Dam near Hot Springs, S. D., the first irrigation unit in the Missouri Basin.

Francis L. Castleman, Jr., 52, dean of the school of engineering at the University of Connecticut since 1946, died at Storrs, Conn., Dec. 30. He was an authority in the field of structural engineering.

Harry A. Shuptrine, 67, for the past 35 years bridge engineer for the Wayne County Road Commission, Detroit, died Dec. 6. He had charge of design and construction of the Davison and John C. Lodge expressways.

LEGAL

Obligations of Contractors To Coordinate Their Work

Three contracts were awarded at the same time to three different contractors by a state building commission for the construction of different parts of the same building. Performance of each contract was limited to 300 days.

One contract was to furnish and install steel bookstacks. Another contractor was to install the plumbing and heating system, while the third contract was to erect the entire building except the work covered by the two other contracts and the electrical work.

Each of the three contracts provided that each contractor would coordinate his work with that of the other contractors so as to facilitate and expedite the completion of the building.

The general contractor brought an action against one of the other contractors to recover damages sustained by it from delays resulting from the failure of the other contractor to proceed with his part of the work so as to permit the general contractor to complete work within time stipulated in the contract, and obtained a recovery.[1]

A defense was interposed that the general contractor had no right of action against the other contractor, since the general contractor was not a party to the contract of the contractor that was being sued. The court held otherwise, stating in its opinion: "We think under the local law [Mississippi], that the contract in suit made the several contractors direct beneficiaries of the contractual provision that any contractor would be liable for any actual damage inflicted upon another contractor on this job because of the breach of any duty assumed under the contract. When to this is added the contractual obligation, upon due notice, to settle with such contractor by agreement or arbitration for the damage caused, the local law created the right of action or caused it to arise out of the facts."

However, in another recent case[2], the court held that the provisions in a government contract requiring the various contractors engaged on the same project to cooperate with one another was intended solely for the benefit of the government and did not give rise to a cause of action in favor of one contractor against another who allegedly had not extended cooperation.

It is to be noted that the determination in the first case above was based on a local statute.

In a third instance[3], the owner of

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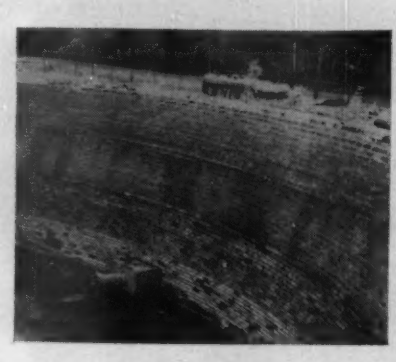
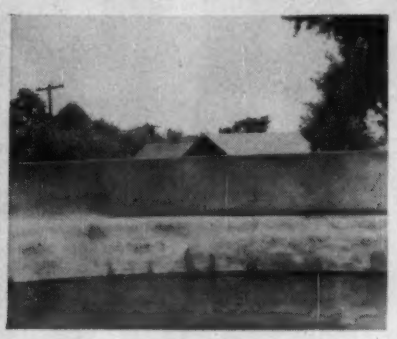
Note: Our Vice President, M. B. Freeman, will attend the A.E.D. Convention, January 23 to 27 in Chicago. He will be at the Conrad Hilton Hotel.





CEMENT GUN COMPANY SOLVES TWO RESERVOIR PROBLEMS WITH "GUNITE"

Photo at left shows crumbling condition of an 80' circular brick reservoir in a western Pennsylvania town. It was one of two such reservoirs owned by the municipality, the other being 50' in diameter. Both leaked badly and were too small to provide desired storage. Photo at right shows how the Cement Gun Company crew solved both problems by coating sides with "GUNITE" and extending the walls 6' in height with pre-stressed "GUNITE." Leakage, of course, was eliminated and the capacity of both reservoirs was increased more than 50%. This is just one of many examples of how the Cement Gun Company has been able to rebuild and reconstruct water storage structures to better-than-new condition and, at the same time, provide needed additional capacity.

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a parcel of land let separate contracts for construction of a drive-in theater, one for grading and one for electrical work. In the course of the grading work, one of the machines destroyed wiring already installed by the electrical contractor. The latter brought suit to recover the damage sustained, and was allowed a recovery, the court held each contractor was independent but was bound to coordinate his work with that of the other contractor.

(1) M. M. Reed Const. Co. v. Virginia Metal Products Corp., 213 F. 2d 337, U. S. Court of Appeals, May 24, 1954.
(2) Brotherton et al. v. Merritt-Chapman & Scott Corp., 1 3 F.2d 477, U. S. Court of Appeals, June 2, 1954.
(3) Southwest General Const. Co. v. Price, 267 S.W. 2d 855, Court of Civil Appeals of Texas, March 26, 1954.

Extra Work Under a Contract

A construction contract contained the following provisions: "(1) The contractor is to furnish all the necessary labor and materials required to construct concrete foundations 10 in. thick, 7 ft. high, exclusive of excavation work except for footings only; foundation footings 8 in. thick, 18 in. wide; cellar floors; front stoop footings; and plastering of exterior foundation walls for 75 houses according to plans prepared by an architect.

Paragraph No. 2 of the contract provided that the owner shall pay the contractor for the performance of the contract at the rate of $375 per house upon condition that such rate should be applicable only to work ordered and commenced within 90 days after the making of the contract. The contract provided how the payments were to be made.

Paragraph No. 3 of the contract, designated "Extra Work", provided as follows: "Extra foundation work to be paid for at the rate of 28 cents per cubic foot for 12-in. walls; sidewalks 4 in. thick to be paid for at the rate of 14 cents per square foot; curbing to be paid for at the rate of 35 cents per lineal foot; payment for said extra work to be made within 30 days after completion of each item."

The contractor brought an action to foreclose a mechanic's lien for an amount allegedly due under the contract and for damages for breach of contract for refusal of the owner to do all the work called for for the 75 houses. The owner counterclaimed for damages for alleged breach of contract on the part of the contractor, claiming he refused to permit the contractor to complete the work because the contractor refused to lay the sidewalks and curbing called for by the contract, pursuant to paragraph No. 3.

The contractor moved to have the owner's counterclaim dismissed on the ground there was no agreement on the

part of the contractor "to proceed with so-called extra work, and hence the agreement with respect to the payment therefor was without mutuality and hence without consideration."

The trial court refused the contractor's application,[1] holding the paragraph in the contract entitled "Extra Work," cannot be disassociated from the balance of the contract and that on the contrary, a more reasonable construction of the contract would be that sidewalks and curbing as well as extra foundations might be required and if so required would be installed by the contractor at the price fixed in the contract."

The court further stated: "The distinction between 'extra work' and 'additional' work is often not easy to draw. Additional work is usually work which results from a change or alteration in the plans concerning work which has been done under the contract, while extra work relates to work which is not included within the contract itself. Of course, a contract may provide both with respect to additional work caused by alterations or changes and for extra work. Fetterolf v. S. & L. Construction Co., 175 App. Div. 177, 161 N.Y.S. 549; Shields v. City of New York, 84 App. Div. 502, 82 N.Y.S. 1020."

The determination of the lower court was reversed by the Appellate Division[2], that court holding the contract contained no provision requiring the contractor to install the curbs and lay the sidewalks. "It merely sets forth an agreed price for such services under the caption 'extra work'. That this term was employed with its ordinary meaning as work independent of the contract and not required in its performance (Shields v. City of New York, 84 App. Div. 502, 82 N.Y.S. 1020; Fetterolf v. S. & L. Construction Co., 175 App. Div. 177, 179, 161 N.Y.S. 649) is evident from the fact that these items are not included in the 'Scope of Work' provision of the contract."

The Court of Apeals[3] reversed the determination of the Appellate Division and affirmed the decision of the lower court, holding; "In our opinion the provisions of the contract fixing the price to be paid for items as 'extra work' clearly implies an obligation to do such extra work at the stipulated price as required in connection with the performance of the work included in the 'Scope of the Work' as described in the contract."

(1) De Martini v. Elade Realty Corp., 52 N.Y.S. 2d 487.
(2) De Martini v. Elade Realty Corp., 45 N.Y.S. 2d 355, 267 App. Div. 773.
(3) De Martini v. Elade Realty Corp., 293 N.Y. 778, 58 N.E. 2d 519.

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Acker power operated soil sampling rigs combine into a compact, portable unit a standard power plant together with powerful hoisting winch and pump. Two models are available — Acker Model RGT for light duty and Acker RG for heavy duty service. These relatively inexpensive units are ideal for soil sampling, jetting and driving pipes or piles.

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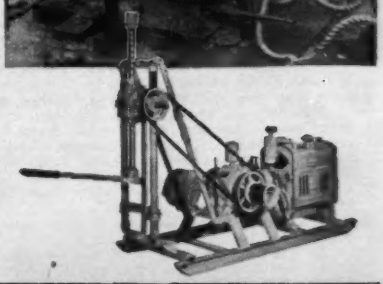

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CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. O. WETZEL, L. M. WINISKI, M. E. SCIORRA, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BIDS ASKED—BUILDINGS

Mass., Seekonk—SCHOOL—BA 1/27—Town, Junior High School Bldg. Comm., James A. Thompson, chn., c/o Supt. Schools, Junior High School, off Newman Ave. $850,000. Plans deposit $50. Rich & Tucker Assoc., 45 Newbury St., Boston, archts. CD 11/3, under LB.

▲ Mass., Cambridge—SCHOOL—BA 2/7—City, School Dpt., 1700 Cambridge St., Ellis-Sleeper-Wyman Elementary School, Ringe Ave. and Haskell St. $1,200,000. M. A. Dyer Co., 24 School St., Boston, archt. CD 3/24.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† T. C. Bateson Constr. Co., 6800 Denton Rd., Dallas, Tex., LB $2,738,150, nine hangars, ENG-19-016-55-62, Portsmouth Air Force Base, PORTSMOUTH, N. H. U. S. Eng., 857 Commonwealth Ave., Boston, Mass. Bids Jan. 7. CD 12/21.

Pascella Bros. Corp., 247 Washington St., Dedham, Mass. LB $924,090, est. $900,000. No. 558, Sect. C, East Street Branch Interceptor, Roosevelt Ave. Branch Interceptor and Mill St. Branch Interceptor, Blackstone Valley Sewer Dist. Comm. at Central Falls, PROVIDENCE, R. I. State of R. I. and Providence Plantations, F. A. Adams, purch agt., State House, Providence, R. I. Bids Jan. 6. CD 12/21.

▲ MASSACHUSETTS—Massachusetts Turnpike Auth., 80 Boylston St., Boston,

Nello L. Teer Co., Durham, N. C. LB $4,306,729. Contr. 51-070. hy. and bridges Charlton, Oxford and Auburn. Bids Jan. 5. CD 12/15.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Girdler Co., 244 E. Broadway, Louisville 1, Ky. CA Est. $9,000,000. anhydrous ammonia PLANT for fertilizer, SEARSPORT, ME. Northern Chemical Industries, Inc., Searsport, Me.

Dr. William Lemscher, Compo Rd., Westport, Conn. Owner Builds. $600,000, SHOPPING CENTER, incl. 8 stores with offices, 66 North Main St., WESTPORT, CONN. Robert I. Carter, 47 Main St., Essex, Conn., archt.

MIDDLE ATLANTIC

SOON LETS CONTRACT—BUILDINGS

N. Y., Syracuse — DORMITORY — Syracuse University, Admin. Bldg., soon lets contract 2 units, 2 4-story, 40x200 ft., one 1-story brick, concrete, steel women's dormitory, Mount Olympus, $900,000. Harry A. & F. Curtis King, 322 S. Warren St., archts.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ NEW JERSEY—New Jersey Turnpike Auth., Administration Bldg., New Brunswick,

Bethlehem Steel Corp., 25 Broadway, New York, N. Y., CA $3,247,045, Contract N.-14, steel superstructure and concrete deck for South East Viaduct, extending from Ave. E. Interchange to vicinity of Brown Pl., Jersey City, Newark Bay-Hudson County Extension of New Jersey Turnpike, Hudson Co. Bids Dec. 7. CD 12/13, under LB.

NEW JERSEY—New Jersey Turnpike Auth., Administration Bldg., New Brunswick,

Harris Structural Steel Co., 419 Fourth Ave., New York 10, N. Y., LB $769,845, Contract N-20, superstructure steel for Bayview Viaduct extending from Caven Point Rd. Interchange to Bayview Ave. in Jersey City in connection with constr. of Newark Bay-Hudson Co. Extension of New Jersey Turnpike, Hudson Co. Bids Jan. 6. CD 12/9.

▲ NEW JERSEY—New Jersey Turnpike Auth., Administration Bldg., New Brunswick.

Horn Constr. Co., 2174 Hewlett Ave., Merrick, L. I., N. Y. CA $1,183,030, Contract N.-13, abutments and piers for connecting ramp, etc. for southwest viaduct extending from Avenue E. Interchange to vicinity of Brown Pl., Jersey City, Hudson Co.;

Baldwin-Lima-Hamilton Corp., Eddystone, Pa., CA $3,576,806, Contract N-22, fabrication, erection of superstructure, steelwork for East Viaduct extending from its west abutment just west of Communipaw Ave. to Pier 1 of West Viaduct north of Grant St. in Jersey City, Hudson Co. Bids Dec. 28, awarded Jan. 6. CD 12/30, under LB.

▲ PENNSYLVANIA—State Hy. Dpt., 506 North Office Bldg., Harrisburg,

Ben Constr. Co., 101 Hargrove St., Pittsburgh, Pa. LB $1,276,532, constr. 3,783 ft. Carson Street Ramp B, Penn Lincoln Parkway west in Pittsburgh and substructure for approach to Fort Pitt Bridge, T. R. 22—30—837, Allegheny Co. Bids Jan. 7. CD 12/13.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Mar-Mes Constr. Co., Inc., 271 North Ave., New Rochelle, N. Y., LB $1,734,200, Ellenville Central SCHOOL, ELLENVILLE, N. Y. Central School Dist. No. 2, Bd. Educ., Maple Ave., Ellenville, N. Y. Bids Jan. 5. CD 11/30.

▲ Bernard Associates, Inc., 86-21 112 St., Richmond Hill, N. Y. CA Approx. $2,000,000, General HOSPITAL, Front St. between Beverly and Clarendon Rds., HEMPSTEAD, N. Y. Hempstead General Hospital, c/o Samuel Paul & Seymour Jarmul, archts., 89-51 164 St., Jamaica, N. Y. CD 12/29.

Joseph L. Muscarelle Ltd., 42 First St., Hackensack, N. J., CA $700,000, 6 story OFFICE, 240 South Harrison St., EAST ORANGE, N. J. Liberty Mutual Insurance Co., 10 Rockefeller Plaza, New York 20, N. Y. Emil A. Schmidlin, 586 Central Ave., East Orange, N. J., archt. CD 3/17.

▲ Franklin Hills Homes, c/o Percy S. Simon, archt., 362 Cedar Lane, Teaneck, N. J., Owner Builds, $1,200,000, 86 HOUSES, Ralph St., Baier Ave., Park St. and other streets, FRANKLIN TWP., N. J.

▲ Denny Building Corp., 2627 Fidelity Phila. Trust Bldg., Phila., Pa. CA $5,000,000, 450-unit RESIDENTIAL DEVELOPMENT, Roosevelt Blvd. PHILA., PA. Normandy Development, c/o contractor.

L-D Building Co., P. O. Box 472, Latrobe, Pa., LB $519,900, general contract new elementary SCHOOL, Reynoldsville-Windslow Joint School Board, REYNOLDSVILLE, PA. Pa. Public School Bldg., Auth., 101 S. 25 St., Harrisburg, Pa. Bids Jan. 6. CD 12/3.

Irwin & Leighton, 1505 Race St., Phila., Pa., CA $600,000, RESTAURANT and parking area, WYNNEWOOD, PA. Stouffer Restaurant Corp., 1375 Euclid Ave., Cleveland, O. Dixon B. Kellogg, 112 Maidson Ave., Detroit, Mich., archt.

SOUTH

BIDS ASKED—BUILDINGS

▲ Ga., Dublin—SCHOOLS—BA 2/10—State School Bldg. Auth., 41 Exchange Pl. S.E., Atlanta, Brewton-Condor Elementary and High School, Wilkes Elementary School mechanical remodeling, Cadwell Elementary School addn., Dexter Elementary School addn. William J. J. Chase & Assocs., 502 Candler Bldg., Atlanta, archts., Consolidated Negro School (Millville area), Negro School (Fleming-Mary Grove Area), Consolidated Negro School (Brewton Area), Webb & Co., 763 Pine St., Macon, archts. Plans deposit $50 each.

▲ Ga., Thomaston — SCHOOLS — BA 2/17 — Georgia School Bldg. Auth., 41 Exchange Pl. S.E., Atlanta, Thomaston Training School for Negroes addn., CD 9/30/52; Lincoln Park Elementary School for Negroes, CD 2/13/52; Yatesville Elementary School for Negroes; Fellowship Elementary School for Negroes; addn. and mechanical remodeling to Yatesville Elementary and High School; addn. and mechanical remodeling to James R. Atwater Elementary and Junior High School; addn. and mechanical remodeling to John Thurston Elementary and Junior High School; addn. and mechanical remodeling to John B. Gordon Elementary and Junior High School addn. and mechanical remodeling to Rock Hill Elementary and Junior High School. Plans deposit $50 each. Charles W. Jenkins, 326 Healey Bldg., Atlanta, archt.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† J. Hilbert Sapp, Inc., P.O. Box 2053, Orlando, Fla., CA $2,618,831, apron paving and warm up pads, base maintenance hangar, deluge fire mains, chapel and 5 squadron operations bldg., Homestead Air Force Base, HOMESTEAD, FLA. U. S. Eng., 575 Riverside Ave., Jacksonville, Fla. Bids Nov. 23. CD 10/13.

† Ivey Brothers Constr. Co., Inc., 3252 Peachtree Rd., Atlanta, Ga., CA $639,681, airmen's dormitories and bachelor officers' quarters, Palm Beach Air Force Base, No. 08-123-55-27, WEST PALM BEACH, FLA. U. S. Eng., P.O. Box 4970, Jacksonville, Fla. Bids Nov. 17. CD 10/8.

▲ LOUISIANA—State Hy. Dpt., Hy. Office Bldg., Baton Rouge,

Boh Brothers Constr. Co., 2400 Cypress St., New Orleans, La., CA $4,145,953, Industrial Canal Bridge over Inner Harbor Navigation Canal at North Claiborne Ave. in New Orleans, State Rt. 1, S. P. 46-02-02, Orleans Parish. Bids Nov. 3. CD 11/5, under LB.

MIDDLE WEST

BIDS ASKED—BUILDINGS

▲ Ind., Indianapolis—SCHOOL—BA 2/2—Washington Township School Bldg. Corp., Claude M. Warren, 711 Electric Bldg., 1 story, bsmnt., brick, rein.-con., Township High School, Proj. A. $1,100,000. Plans deposit $50. E. I. Brown Co., 701 Circle Tower, Zone 4, archt. CD 5/5.

▲ Ill., Joliet—ACADEMY—BA 2/3—Sisters of St. Francis, 373 Western Ave., girls academy and convent. $1,650,000. E. Brielmaier & Sons Co., 735 N. Water St., Milwaukee, Wis., archt. CD 10/19.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ Ferro Concrete Constr. Co., 203 W. 3 St., Cincinnati, O. LB, $1,700,916, power and service bldg., Mill Creek Sewage Works, CINCINNATI, O. City, City Hall, Cincinnati, O. Bids Dec. 28.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Dunbar Co., 8201 Cedar Ave., Cleveland 3, O., CA $1,000,000. four 1 story and three 2 story masonry STORES, approx. 10,000 sq. ft. total floor space, on Shaker Square, CLEVELAND, O. Shaker Square Co., 13124 Shaker Square, Cleveland 20, O. Small, Smith & Reeb, 1010 Euclid Ave., Cleveland 15, O., archts. Awarded Jan. 5.

▲ Frank Messer & Sons, Inc., 4612 Paddock St., Cincinnati, O. LB $1,854,800. general constr. 180x200 ft. stone exterior Marshon Memorial AUDITORIUM, at Ohio State University, COLUMBUS, O. State Dpt. P. Wks., State Dpts. Bldg., Columbus, O. Bellman, Gillett & Richards, 518 Jefferson St., Toledo, O., archts. Bids Dec. 21.

▲ Herlihy Mid-Continent Co., 135 S. La Salle St., Chicago 3, Ill., CA, $1,841,650, Parking GARAGE, Huron, Fairbanks, St. Clair and Superior Sts., CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids Dec. 3. CD 12/17, under LB.

▲ Owner, c/o Louis R. Solomon, 61 W. Superior St., Chicago 10, Ill. Separate Contracts. $2,500,000. 18 story, 220-unit APARTMENT, 3440 Lakeshore Dr., CHICAGO, ILL. CD 11/12.

† Keno Constr. Co., Box 37, Highland Park, Ill., CA, $879,700, INDUSTRIAL BLDGS., etc., Badger Ordnance Plant, ENG-47-55-3, BARABOO, WIS. U. S. Eng., 428 Federal Bldg., Milwaukee, Wis. Bids Dec. 22. CD 12/29, under LB.

▲ Ralph Biernbaum, 25 Exchange St., Rochester, N. Y. Owner Builds. $1,750,000. SHOPPING CENTER, 25 stores, US-131, GRAND RAPIDS, MICH.

(Continued on page 66)

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England
Middle Atlantic
South
Middle West
West of Mississippi
Far West

PROPOSED WORK
Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Public Buildings
Mass Housing
Commercial Buildings
Industrial Buildings
Unclassified

In These Stages

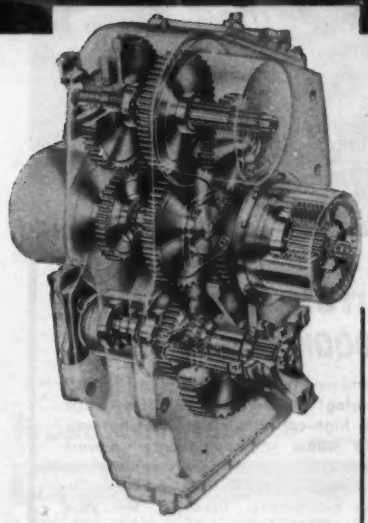
PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily issue in which last previous report was published.

Symbols and Abbreviations Include:

▲ Federal Government
ENR Project of $1,000,000 or over.
CD Engineering News-Record
† Construction Daily
For additional reports see Construction Daily.

Driver's left hand rests on power-shift levers—there's no clutch pedal



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TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin
Hydraulic Division, Rockford, Illinois

(Continued from page 64)

▲ **Practical Home Builders, Inc.,** 13440 W. Seven Mile Rd., Detroit, Mich. Owner Builds. $1,400,000. 130 single HOUSES, Fort Street area, RIVERVIEW, MICH.

Bert L. Smokler & Co., 1200 Penobscot Bldg., Detroit, Mich. Owner Builds. $540,000. sixty-two 1 story DWELLINGS, Thorncroft, Millard and Sunnybrook Sts., ROYAL OAK, MICH.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

† **Tex., Sherman**—READINESS CREW BLDG., etc.—BA 1/31—U. S. Eng., P.O. Box 61, Tulsa 2, Okla., readiness crew bldg. and ready rocket storage bldg., readiness (operation maintenance) hangar with shops, Perrin Air Force Base, Inv. No. ENG-34-066-55-45. $300,000-$750,000. CD 9/11/53.

† **Ark., Blytheville**—PARACHUTE, etc.—BA 2/17—U. S. Eng., P.O. Box 867, Little Rock, remodeling and addn. to parachute and dinghy bldg. and communications bldg., Blytheville Air Force Base, ENG-03-050-55-72, $100,000-$500,000. CD 12/1/53.

BIDS ASKED—BUILDINGS

▲ **N. M., Albuquerque**—DORMITORY—BA 3/1—University of New Mexico, Bd. Regents, Albuquerque, first phase women's dormitory. $1,700,000. Meem, Zehner, Holien & Assoc., Box 528, Santa Fe, archts.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

MINNESOTA—State Hy. Dpt., 1246 University Ave., St. Paul,

Woodrich Constr. Co., Hopkins, Minn. CA $783,781. c.conc. 14 mi. between Foley and Milaca, Benton and Mille Lacs Counties. CD 12/22, under LB.

Ferguson Constr. Co., Eunice, N. M. CA $518,500. 42.8 mi. crude oil pipe line from Maljamar Station to Tulk Pool, Lea Co., NEW MEXICO. Texas-New Mexico Pipe Line Co., 721 San Jacinto St., Houston, Tex.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **H. Shanedling Sons Corp.,** 2025 Nicollett Ave., Minneapolis, Minn. Owner Builds. $1,000,000. Northbrook SHOPPING CENTER, 22 brick stores, on site South of Hy. 100 on tract enclosed by 57 Ave. North Hy. 100 and Logan Ave. North, BROOKLYN CENTER, MINN. S. C. Smiley, 1645 Hennepin Ave., Minneapolis, Minn., archt. for Sect. 1; Thorshov & Cerny, 400 Metropolitan Bldg., Minneapolis, Minn., archt. Sect. 2. CD 9/27.

▲ **Fruin-Colnon Contg. Co.,** 1706 Olive St., St. Louis 3, Mo. CA Est. $1,000,000. 1 story, 240x520 ft. refrigerated WAREHOUSE to contain 1,000,000 cu. ft. refrigerated space on 27 acre tract north side Page Blvd. west of North and South Rd. in Vinita Park area, ST. LOUIS COUNTY, MO. Merchants Refrigerating Co., Lewis and O'Fallon Sts., St. Louis 6, Mo.

▲ **Thomas S. Byrne, Inc.,** Fort Worth Natl. Bank Bldg., Fort Worth, Tex., CA $1,500,000. department STORE, FORT WORTH, TEX. Monnigs Department Store, Otto Moning, pres., 5 and Throckmorton Sts., Fort Worth, Tex. CD 8/17.

▲ **Riedesel Constr. Co.,** 2325 Ninth Ave. N., Billings, Mont. CA Est. $1,000,000. 4 story OFFICE, HELENA, MONT. Western Life Insurance Co., Helena, Mont. CD 2/18.

FAR WEST

BIDS ASKED—BUILDINGS

Ore., Eugene—CLUB—BA 1/28—Young Mens Christian Assn. and Young Womens Christian Assn., Eugene, club bldg. $525,000. Hamlin & Martin, 159 W. 12 St., archts. CD 12/15.

SOON LETS CONTRACT—BUILDINGS

▲ **Calif., Muroc**—PLANT FACILITIES—Douglas Aircraft Co., 3855 Lakewood Blvd., Long Beach, soon lets contract plant facilities for Convair and Douglas at Edwards Air Force Base, $1,500,000. Austin, Field & Fry, 2311 W 3 St., Los Angeles, archts.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **IDAHO**—Bureau P. Rds., Dpt. Commerce, 210 Main St., Boise.

Peter Kiewit Son's Co., Idaho Falls, Idaho, CA $700,757, clearing, grubbing, grading, draining 9.79 mi. C standard road on Banks-Lowman Rd., Boise Co. Bids Dec. 29. CD 12/20.

† **Wheelwright Constr. Co.,** Ogden, Utah, CA $819,611, est. $827,605, earthwork, concrete pipe lines and structures for equalizing and wasteway reservoir and Weber Aqueduct Spec. DC4285, Weber Basin Proj., Davis and Weber Counties, UTAH. Bureau Reclamation, Dpt. Interior, Ogden, Utah. Bids Dec. 15, awarded Dec. 30. CD 12/28, under LB.

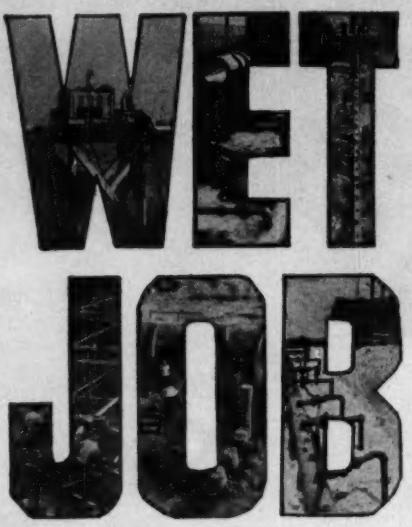
Peter Kiewit Sons Co., 345 Kieways, Arcadia, Calif., LB $545,698, Imprv. Terminal Island Sewage Treatment Plant, LOS ANGELES, CALIF. City, City Hall, Los Angeles, Calif. Bids Jan. 5. CD 12/2.

BUILDINGS

LOW BIDS AND CONTRACTS

H. L. Brian, Jr., 1085 N. Palm St., Anaheim, Calif., CA, $778,000. 82 frame, stucco DWELLINGS, La Palma St., Tract 2082, ANAHEIM, CALIF. D. & C. Homes, 1085 N. Palm St., Anaheim, Calif.

IF IT'S A



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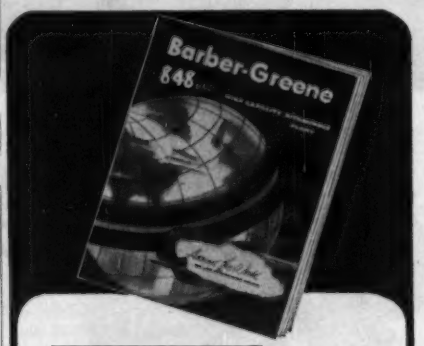

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Lakewood Estates Development Co., 11687 San Vicente Blvd., Los Angeles, Calif., Owner Builds, $822,200 89 frame, stucco DWELLINGS, Charlwood and Edgefield Sts., BELLFLOWER, CALIF.

▲ Larwin Co., 242 S. Beverly Dr., Beverly Hills, Calif., CA, $1,647,000. 183 DWELLINGS, Fenimora, Edenfield, Bygrove, Davanah, Citrus Sts., COVINA, CALIF. Hathaway Homes, Balienture Homes, 242 S. Beverly Dr., Beverly Hills, Calif.

F. E. Young Constr. Co., 2141 Main St., San Diego, Calif., CA, $641,900, 35,354 sq. ft. inter-community HOSPITAL addn., COVINA, CALIF. Inter-Community Hospital, 275 W. College St., Covina, Calif. Bids Dec. 8, awarded Jan. 3. CD 12/16, under LB.

Home Investment Co., Box 6507, Long Beach, Calif., Owner Builds, $645,600, 60 frame, stucco DWELLINGS, Condar Ave., Los Arcos St. and Faust Ave., GLENDORA, CALIF.

▲ Irby Building Co., 150 S. Flower St., Glendora, Calif., Owner Builds, $1,229,500. 124 Frame, stucco DWELLINGS, Worthy and Burnsby Drs., GLENDORA, CALIF.

▲ Wm. Simpson Constr. Co., 2401 Beverly Blvd., Los Angeles, Calif., CA, $3,000,000, 12 story OFFICE, 6 and Flower Sts., LOS ANGELES, CALIF. Superior Oil Co., 601 W. 5 St., Los Angeles, Calif. Claud Bielman & Assocs., 7421 Beverly Blvd., Los Angeles, archts. Awarded Jan. 3.

J. H. Collins & Assoc., 548 S. San Vicente St., Los Angeles, Calif., CA, $669,500. 91 frame, stucco DWELLINGS, California Ave. and Foxworth St., PUENTE, CALIF. Max Builders, 548 S. San Vicente St., Los Angeles, Calif.

▲ West Covina Properties, 1401 W. Valinda St., Puente, Calif., Owner Builds, $1,457,700, 146 frame, stucco DWELLINGS, Dubison and Dalark Sts., PUENTE, CALIF. Ayers & Fiegl, 4253 Coldwater Canyon, North Hollywood, Calif., archts.

Herbert Goldsworthy, Box 710, Santa Monica, Calif., LB, $517,000, 30,000 sq. ft. SCIENCE and HOMEMAKING BLDG., SANTA MONICA, CALIF. Santa Monica Bd. Educ., 1333 6 St., Santa Monica, Calif. Bids Jan. 5. CD 12/22.

▲ Stiglbauer Brothers, 8148 E. Phlox St., Downey, Calif., CA, $1,123,975, Little Lake HIGH SCHOOL, WHITTIER, CALIF. Whittier Union High School District, 610 W. Philadelphia St., Whittier, Calif. Bids Dec. 20, awarded Jan. 4. CD 12/2.

Beckner Constr. Co., 2650 River Ave., San Gabriel, Calif., CA, $587,500, 36,000 sq. ft. Intermediate SCHOOL No. 2, WHITTIER, CALIF. Whittier School Dist., 215 W. Hadley St., Whittier, Calif. Bids Dec. 15, awarded Jan. 4. CD 12/29, under LB.

CANADA

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

SASKATCHEWAN—Dpt. Hys. & Transportation, Regina, Traves & Ducas Constr. Co. Ltd., Radville, Sask., CA, $650,284, roadwork between Weyburn and Ibsen Sask. Hy. No. 39, Regina. CD 10/1/43.

BUILDINGS

LOW BIDS AND CONTRACTS

Hodgson, King & Marble, 1401 Main St., Vancouver, B. C., CA, $789,989, BANK, Kingsway and McKay Aves., BURNABY, B. C. Royal Bank of Canada, 360 St. James St. W., Montreal, Que. E. P. Warren, c/o owner, archt.

▲ Patrick Harrison & Co. Ltd., 14 St., Noranda, Que., CA, $2,000,000, sinking 1,300 ft. shaft in new MINING DEVELOPMENT in Mystery Lake area of northern Manitoba, Lynn Lake, MANITOBA, International Nickel Co. of Canada Ltd., 25 King St. W., Toronto, Ont. Awarded Jan. 4.

▲ Foundation Co. of Canada Ltd., 166 Douglas St. W., Sudbury, Ont., CA, $3,750,000. first seven buildings for new Ontario Mental HOSPITAL, Cooks Mills near NORTH BAY, ONT. Dpt. P. Wks., Parliament Bldgs., Toronto, Ont. Bids Oct. 14, awarded Jan. 7. CD 9/15.

▲ Rod and Jacques Larose Ltee, 7409 Boyer St., Montreal, Que. Owner Builds. $1,100,000 HOUSING DEVELOPMENT, incl. 100 houses, Garieby St., MONTREAL NORTH, QUE. R. Chalifoux, 6275 Papineau Ave., Montreal, Que., archt.

Proposed Projects

WATER SUPPLY

▲ Ill., East Moline—City, City Hall, water filtration plant, addns. to distr. sys., $1,350,000. Consoer, Townsend & Assocs., 351 E. Ohio St., Chicago, Zone 11, consult. engrs. CD 2/19/52.

▲ Ia., Dubuque—City, City Hall, water softening plant. $1,500,000. Consoer, Townsend & Assocs., 351 E. Ohio St., Chicago 11, Ill., consult. engrs. CD 11/8.

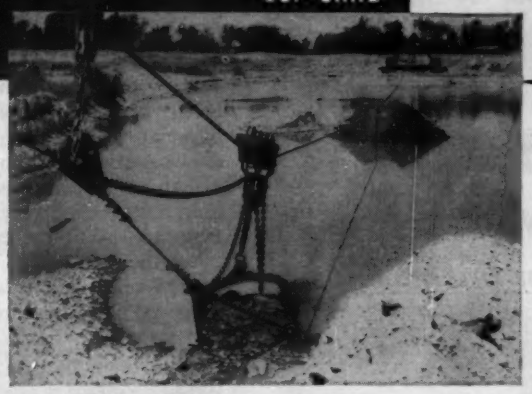
▲ Mich., St. Joseph—City, Lake Michigan intake and water filtration plant addns. $1,500,000. Consoer, Townsend & Assoc., consult. engrs., 351 E. Ohio St., Chicago, Ill. made the report.

▲ Minn., St. Cloud—City, water softening plant. $1,600,000., Consoer, Townsend & Assoc., 351 E. Ohio St., Chicago 11, Ill., consult. engrs. CD 6/16.

▲ Tex., Beaumont—City, Elmo Beard, mayor, water sys. rehabilitation, $15,000; water mains, running from filtration plant out into new areas of the city now without mains, $850,000; distr. lines throughout the city, $1,000,000. CD 6/6/47.

the pit: tough... 70% ROCK 30% SAND

the machine: Sauerman 2½-cu. yd. slackline cableway excavator



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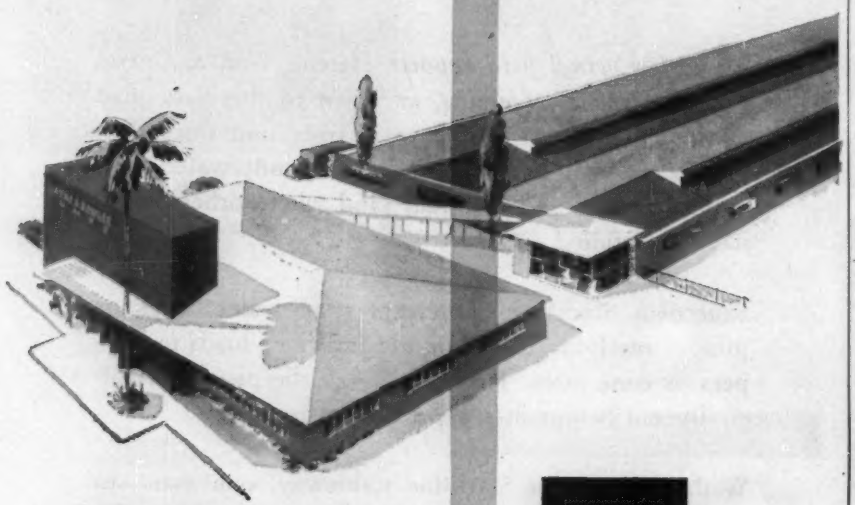

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on the farm

for the city

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▲ Tex., Corpus Christi—City, City Hall, 48 in. water main Clarkwood to Savage Lane. $1,088,000. R. L. Otto, city engr. CD 11/5/43.

SEWERS, WASTE DISPOSAL

▲ Ia., Dubuque—City, City Hall, sewage treatment plant, intercepting sewers. $1,800,000. Consoer, Townsend & Assocs., 351 E. Ohio St., Chicago 11, Ill., consult. engrs. CD 7/20/45.

▲ La., Lake Charles—First Dist. Sewerage Bd., sewerage constr. $2,000,000. Elmer E. Shutts, 324 Pujo St., consult. engr. CD 3/16/50.

▲ Wis., Green Bay—City, 3 year program for storm sewers, $1,316,000; $424,000 expended in 1955. CD 9/8/53.

▲ Ont., Toronto—Municipality of Metropolitan Toronto, 67 Adelaide St. East, sewage disposal plant on Humber Valley Golf Course $14,000,000. trunk sewer $1,250,000. sanitary trunk sewer in Humber Valley 8,000 ft. $500,000. CD 2/8.

▲ Sask., Regina—City, City Hall, new trunk sewers in various sections of city $7,074,400. Alvord, Burdick & Howson, 20 N. Wacker Dr., Chicago, Ill., U.S.A. consult. engrs. CD 11/19.

STREETS AND ROADS

▲ UTAH—State Road Comn., Salt Lake City,
Box Elder Co.—6 mi. between Blue Creek Junc. and Promontory FAS. $180,000.
4.7 mi. from Connor's to Penrose FAS $25,000.
Cache Co.—imprv. 5 mi. between Trenton and Clarkston FAS, $160,000.
Iron Co.—15.7 mi. U.S. 91, FA. Buckhorn Flat, $800,000.
Salt Lake Co.—3.5 mi. four-lane hy. widened and straightened, FA. U.S. 40, $1,418,000.
U. S. 91 Salt Lake to Davis Co. 3.5 mi., $800,000.
Summit Co.—7.9 mi. U.S. 303 from Emory to Wastch FA, $335,000.
Uintah Co.—U. S. 40 between Vernal-Jensen FA, $780,000.
Utah Co.—3.5 mi. Utah 52 from Orem to mouth of Provo Canyon, $100,000.
U. S. 189 from Provo to mouth of Provo Canyon $160,000.
Weber Co.—Henefer to Echo Junction, $500,000. CD 5/10/44.

EARTHWORK, WATERWAYS

▲ Calif., Gilroy—South Santa Clara Valley Water Conservation Dist., Gilroy, $2,111,000, bond election Feb. 1, Uvas Dam. CD 5/8/53.

AIRPORTS

▲† Md., Andrews Air Force Base—UTILITIES—U. S. Eng., First and Douglas Sts. N. W., Wash. 25, D. C., utilities, hospital area, $500,000-$1,000,000; masonry headquarters bldg. Div. A.D.C., $350,000-$500,000. CD 10/1/51.

▲ Mich., Detroit—AIRPORT—Bd. Supervs., Wayne Co., 3800 Cadillac Tower, terminal bldg. $5,500,000; aprons, taxiways and runways, $3,200,000; custom bldg., underground fuel storage, lighting, $1,300,000. Leroy C. Smith, city engr. CD 7/29/51.

▲† N. D., Grand Forks—JET FIGHTER BASE—U. S. Eng., 1709 Jackson St., Omaha, Neb., jet fighter base. $7,050,000.

PUBLIC BUILDINGS

▲ Calif., Glendale—MEMORIAL CENTER—City, City Hall, $3,250,000 bond election Apr. 12, memorial center. CD 3/18/46, under Unclassified.

▲ Calif., Los Angeles—SCHOOLS—Bd. Educ., 1425 S. San Pedro St., $133,000,000 bond election Apr. 5, new schools. CD 6/13/52.

▲ Calif., Nevada City—SCHOOLS—Nevada Union High School District, Buena Vista St., Grass Valley $1,600,000 bond election May 15, new schools Nevada City and Grass Valley. CD 10/7/52.

▲ Calif., Redwood City—SCHOOLS—Sequoia Union School Dist., Broadway and El Camino Real, $6,250,000 bond election Mar. 1, two new high schools and addns. CD 12/15.

▲ Calif., Tulare—SCHOOL—Tulare School Dist., 600 N. Cherry Ave., $1,250,000 bond election Feb. 4, new school.

▲ Conn., East Hartford—SCHOOLS—Town, Francis L. Paquette, chn. School Bldg. Comn., Town Hall, High School South End, $1,000,000; school between Oak and Forbes Sts., $350,000.

▲ Mich., Port Huron—SCHOOL—City, J. F. Gibbs, mgr., plans by Wyeth & Harmon, Inc., 1602 Military St., and Louis C. Kingscott & Assoc., 511 Monroe St., Kalamazoo, high school, $1,800,000. CD 11/25/52.

▲ Mo., Clayton (St. Louis 5, P. O.)—HOSPITAL—St. Louis County, c/o Luman P. Matthews, co. supervs., Court House, plans by Leo A. Daly Co., 411 N. 7 St., Ambassador Bldg., St. Louis, Zone 1, 150-bed hospital to care for chronically ill. First unit of 100-bed capacity, 3-story, est. $1,859,268, with 50-bed addn. to follow. Total $2,225,000. CD 10/16/44.

▲ Mont., Boulder—ASSEMBLY HALL, etc.—State, Bd. Examiners, Helena, plans by J. G. Link & Co., 111 N. Montana St., Butter, assembly hall, classroom unit,

boys' and girls' dormitory at State Training School for retarded children, $1,500,000. CD 11/10.

▲ **N. J., East Paterson**—SCHOOL—Bd. Educa. 16 Ave., plans by Alfonso Alvarez, 243 Lorain Ave. Upper Montclair, Junior-Senior High School. $2,000,000.

▲ **N. Y., Bedford—Mt. Kisco**—HIGH SCHOOL—Central School Dist. 2, Mt. Kisco, plans by Moore & Hutchins, 215 E. 37 St., New York, Zone 16, Junior-Senior High School, 155-acre tract, on Rte. 172. $3,000,000.

▲ **Pa., Media**—HIGH SCHOOL—Central Delaware County Joint School Dist., Media, plans by The Ballinger Co., 121 N. Broad St., Phila., high school at Lima. $2,000,000.

▲ **Pa., Sanatago**—HIGH SCHOOL—Joint School Bd., Lower, Upper and West Pottsgrove Twps., Sanatago, plans by Buchart Eng. Corp. of Lancaster, archts.-engrs., 920 Columbia Ave., Lancaster, Junior-Senior High School. $1,800,000.

▲ **Wis., Waukesha**—COURT HOUSE—**Waukesha Co.**, plans by Foss-Jansma, Inc., 111109 W. Blue Mound Rd., Milwaukee, court house. $1,700,000.

▲ **Ont., Sudbury**—SCHOOL—Nickel District High School Bd., Sudbury, plans by Alward & Gouinlock, 57 Bloor St. W., Toronto, high school $1,340,000.

COMMERCIAL BUILDINGS

▲ **Calif., La Habra**—DWELLINGS—**Howard L. Torry,** 4400 Old Spanish Trail, Houston, Tex., plans by L. C. Major & Assocs., 11015 S. Paramount Blvd., Paramount 150 frame, stucco dwellings. $1,500,000.

▲ **Calif., Sacramento** — DEPARTMENT STORE — **Sears, Roebuck & Co., 12 and K Sts.**, store, on Swanston Estates Property, $2,500,000.

▲ **Calif., San Mateo**—OFFICE—Economy Builders, Inc., 500 S. El Camino Real, San Mateo, 6 story office, $12,000,000.

▲ **Conn., West Hartford**—SHOPPING CENTER—Corbin Realty Corp., Neil H. Ellis, secy. Crosby Rd., Manchester, plans by A. H. Salkowitz, 37-60 82 St., Jackson Heights, N. Y., shopping center, incl. 40 stores, 3,000 car parking area, 37-acre tract Corbin's Corner, south side of New Britain Ave. $5,000,000.

▲ **Md., Glen Burnie**—DEPARTMENT STORE—Hochschild Kohn & Co., Lexington and Howard Sts., Baltimore, Zone 1, plans by Rogers & Taliaferro, 18 West St., Annapolis, Md., 150,000 sq. ft. department store in connection with new 50-store shopping center, Harundale, near here.

▲ **Mass., Sharon**—RESIDENTIAL DEVELOPMENT—Martin Cerel, 18 E. Central St., Natick, residential development, 150 units, adjacent to Lake Massapoag, $2,000,000.

▲ **Mich., Mt. Clemens**—SHOPPING CENTER—Harvey Bielfield, 833 Penobscot Bldg., Detroit, plans by Theodore Rogvoy, 929 Fox Bldg., Detroit, 25-stores, Ingleside Shopping Center, $1,500,000.

▲ **Minn., Duluth**—BANK—First and National Bank, W. D. Wiard, pres., Third Ave. W. and Superior St., plans by T. J. Shefchik, 307 Lonsdale Bldg., Duluth, 8 story bank, $2,500,000.

▲ **N. J., Newark**—OFFICE—Mutual Benefit Life Insurance Co., 300 Broadway, plans by Eggers & Higgins, 100 E. 42 St., New York 17, N. Y. home office, Broad St. opposite Washington Park, $8,000,000.

▲ **N. Y., Flushing** — APARTMENT — Kissena Manor Corp., c/o Julius Fishkind, archt., 161-19 Jamaica Ave., Jamaica, 6 story apartment, Kissena Blvd., west of Franklin Ave. $1,500,000.

▲ **N. Y., New York** — CATHEDRAL, etc. — Armenian Church in America, 630 Second Ave., Zone 16, plans by Eggers & Higgins, 100 E. 42 St., Zone 17, cathedral and cultural center, Second Ave. between 34 and 35 Sts. $1,000,000. CD 9/15/49.

▲ **N. Y., New York**—CHURCH, etc.—Church of St. Benedict, 2956 Bruckner Blvd., Zone 61, plans by Paul C. Reilly, 111 Fifth Ave., Zone 3, 2 story church and 3 story convent, in block bounded by Bruckner Blvd., Edison, Logan and Otis Aves. $1,000,000.

▲ **N. Y., New York**—APARTMENT—50 Sutton Place Corp., 120-44 Queens Blvd., Kew Gardens, plans by Lawrence M. Rothman, 147 E. 125 St., New York, Zone 35, 19 story apartment, 50 Sutton Place South. $4,000,000.

▲ **N. Y., New York** — HOSPITAL WING — Lenox Hill Hospital, 76 St. and Park Ave., plans by York & Sawyer, 101 Park Ave., Zone 17, 12-story wing and other facilities. $3,500,000. CD 12/15.

▲ **N. Y., New York**—OFFICE—Syndicate, c/o Abraham Marinoff, 793 Madison Ave., plans by Ervin Palmer, 624 Madison Ave., 16 story office, 515 Park Ave., southeast corner 60 St. $1,500,000.

▲ **Okla., Tulsa**—APARTMENT HOTEL—Columbia Apartments, Inc., Kennedy Bldg., plans by Steele, Sandham & Steele, 412 Electric Bldg., Omaha, Neb., 15 story apartment hotel, 21 and Columbia Sts. $2,000,000.

▲ **Tex., Houston**—APARTMENT—Syndicate, c/o Joe L. Albritton, Trustee, Sterling Bldg., 21 story, 312 unit apartment, 2½ acre tract near Hermann Park at Almeda Rd. $3,000,000.

▲ **Tex., Irving**—SHOPPING CENTER—Mayflower Investment Co., Irving, and c/o Carr P. Collins & Assocs., 912 Commerce St., Dallas, plans by Wyatt C. Hedrick, archt.-engr., 904 Fort Worth Ave., Dallas, shopping centers, Units 1, 2 and 3. $1,050,000.

▲ **Tex., Pasadena**—DWELLINGS—R. G. Whitman, 2305 Merle St., Houston, 25 cedar shake, brick trim dwellings; 33 frame, masonry trim dwellings; 29 cedar shake and brick trim dwellings in last sect. of Shaver Pl. $1,065,000.

▲ **Tex., San Antonio**—DWELLINGS—Ray Ellison Homes, Inc., Westridge Park, 28 frame dwellings; 35 frame, brick trim dwellings; 38 frame dwellings, in Westridge Park Subdivision for Negroes. $1,036,100.

▲ **Wis., Waukesha**—HOUSING—Lowe & Old Constr. Co., 149 W. Broadway, 63 houses, $1,050,000; 22 houses, $220,000.

▲ **Ont., Toronto**—APARTMENT—Owner, c/o W. Shulman, archt., 1173 Bay St., two 10 story, bsmnt., 53x99 ft., penthouse, 62-suite, steel frame, concrete, brick apartment bldgs., 561 Avenue Rd. $1,200,000.

INDUSTRIAL BUILDINGS

▲ **Calif., San Francisco**—PLANT, etc.—S & W Fine Foods, Inc., 155 Berry St., plans by Albert F. Roller, 1 Montgomery St., coffee plant, office, warehouse. $1,750,000. CD 7/23.

▲ **Ia., Davenport**—MILL—Aluminum Co. of America, Gulf Bldg., Pittsburgh, Pa., rolling mill addn. $5,000,000. CD 10/10/52.

▲ **Mo., Sedalia**—WAREHOUSE—Pittsburgh Corning Corp., 420 Fort Duquesne Blvd., Pittsburgh, Pa., branch warehouse, $1,500,000.

▲ **O., Dayton**—ENGINEERING and RESEARCH—National Cash Register Co., S. Main and K Sts., 6 story, engineering and research bldg. with 210,000 sq. ft. office and laboratory space, west side of S. Main St. $4,000,000.

▲ **O., Kettering**—FACTORY—Specialty Papers Co., 802 Miami Chapel Rd., Dayton, 1 story, 125,000 sq. ft. factory, south of Dorothy Lane, between extended Woodman Dr. and Cemetery Rd. $1,250,000.

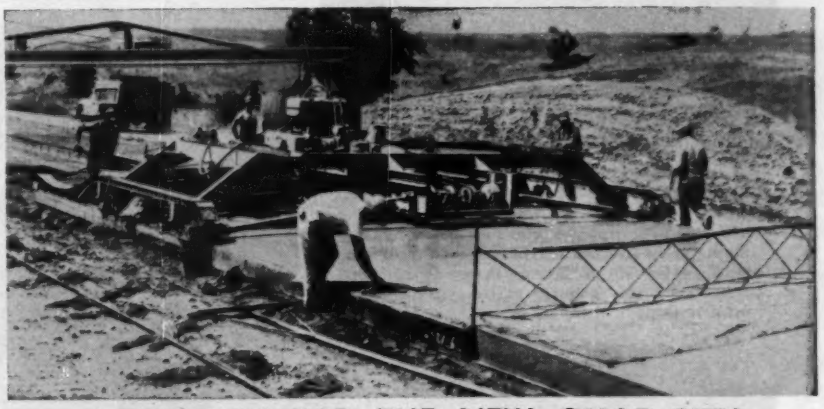
▲ **Pa., Pittsburgh**—GARAGE—Equitable Life Assurance Society of the U. S., 393 7th Ave., New York, N. Y. concrete and reinforced steel 600-car capacity parking garage, open deck ramp. $1,500,000. H. K. Ferguson Co., 1783 E. 11 St., Cleveland, O., engr.

▲ **Tex., Houston**—PARKING GARAGE—Tennessee Gas Transmission Corp., Commerce Bldg., plans by C. Herbert Cowell & Hugo Neuhaus, Jr., 2302 LaBranch St., 4 to 5 story, 400,000 sq. ft. parking garage. $2,240,000. H. E. Bovay, Jr., M. Esperson Bldg., consult. engr. and Thomas E. Willier, Commerce Bldg., traffic consult. CD 8/31.

▲ **Ont., Toronto**—FACTORY, etc.—Crouse-Hinds Co. of Canada Ltd., 7 Labatt Ave., Toronto, 50,000 sq. ft. warehouse and factory near Birchmount Ave. on 18-acre site, $6,000,000. Giffels & Vallet of Canada Ltd., Canada Trust Bldg., Windsor, consult. engrs. CD 12/29.

UNCLASSIFIED

▲ **Ont., St. Thomas**—AUTOMATIC TRAIN CONTROL SYSTEM—New York Central System, C. F. Grimes, engr., R.R. 4, St. Thomas, automatic train control sys. from St. Thomas (Windsor to Fort Erie and Suspension Bridge, Niagara FaHs). $1,500,000-$2,000,000.



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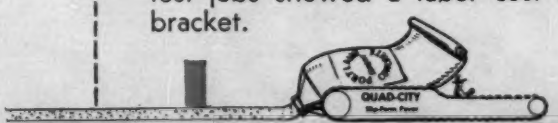

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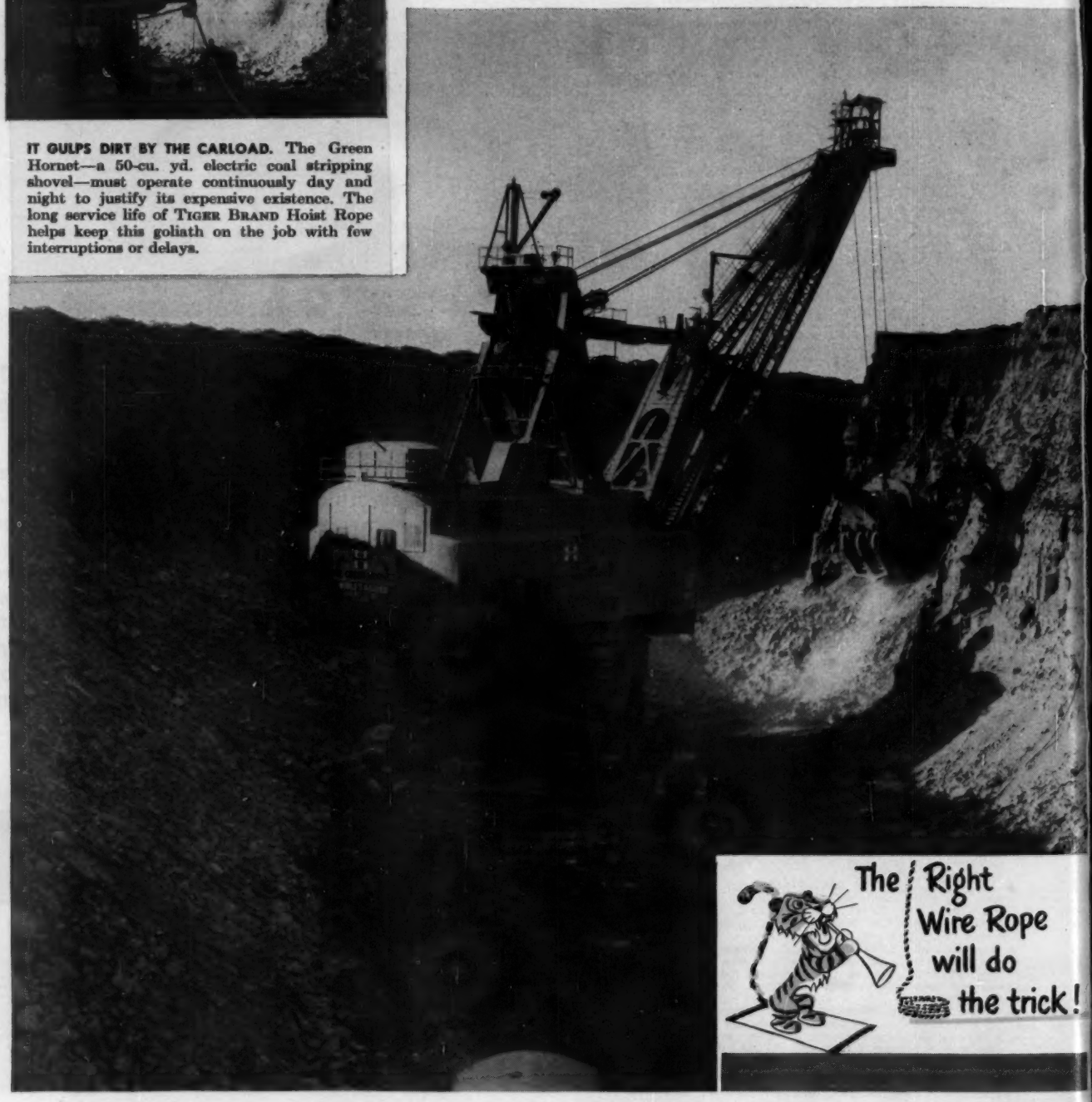

yards of tough digging

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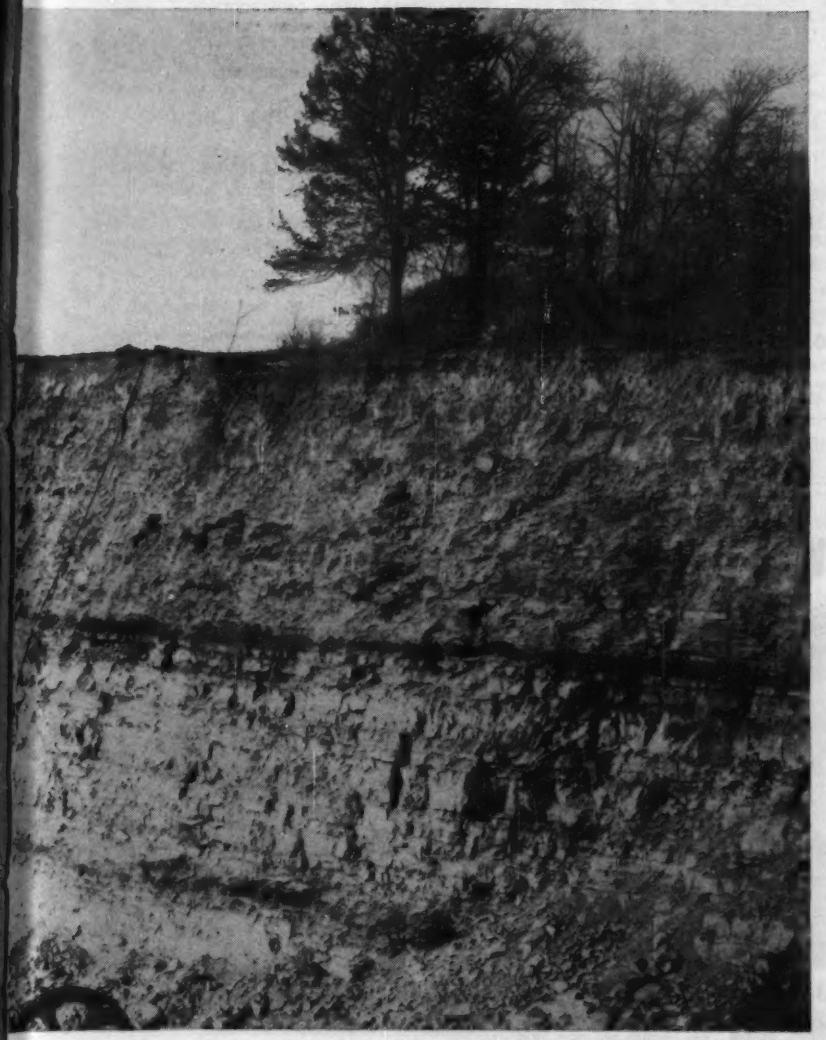

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NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
January 27, February 3 Massachusetts

▲ **MASSACHUSETTS**—BA 2/8—Massachusetts Turnpike Auth., 80 Boylston St., Boston, Palmer—Contr. 51-052 hy. and bridge constr. $2,500,000. Plans deposit $60. Howard, Needles, Tammen & Bergendoff, 80 Boylston St., Boston, engrs. CD 8/11.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
February 3 New Jersey & Pennsylvania
STREETS AND ROADS
January 25 Maryland

SOON LETS CONTRACT—BUILDINGS

▲ **Pa., Pittsburgh**—HOSPITAL, etc.—soon lets contract—West Penn Hospital, 4800 Friendship Ave., 2 story, bsmnt. brick, block hospital addn., alterations, $3,000,000. Alfred Reid Assoc., 1401 Keystone Bldg., archts. CD 9/10/53.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **Fischback & Moore, Inc.**, 226 E. 41 St., New York, 17, N. Y., CA $2,352,806, furnishing, installing cable equip. for Rockaway Line, IND Div., NEW YORK. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids Dec. 3. CD 12/17, under LB.

▲ **Mount Vernon Bridge Co.**, Sugar and Adams Sts., Mt. Vernon, O., CA $3,176,577, fabrication and erection superstructure for Barnhart Island Bridge over St. Lawrence River, near Massena, St. Lawrence Co., Spec. 5422-C, St. Lawrence Contr. No. 6, NEW YORK. The Power Authority of the State of New York, 270 Broadway, New York 7, N. Y. Bids Dec. 7. CD 12/9 under LB.

▲† **U. S. Eng., 80 Lafayette St., New York 13, N. Y.** indefinitely postponed bids to have been opened Feb. 10, AM dormitory and BOQ, FY 55, Stewart Air Force Base, NEWBURGH, N. Y. $1,000,000-$3,000,000. James C. MacKenzie, 5 E. 57 St., New York 22, N. Y., archt. CD 11/12.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Deer Park Homes, Inc.**, c/o Alwin Cassens, Jr., archt., 145 S. Franklin Ave., Valley Stream, N. Y. Owner Builds. $7,000,000. 500 HOUSES, tract adjoining Belmont Lake State Park on Deer Park Ave., BABYLON, N. Y.

▲ **Caristo Constr. Co.**, 26 Court St., Brooklyn 2, N. Y. CA $3,253,000, general constr.;
Bank Electrical Co., 126 W. 32 St., New York 1, N. Y. CA $730,000, electrical work for Wm. E. Grady Vocational HIGH SCHOOL, Brighton 6th St. between Shore Parkway and Brighton 4th Rd., BROOKLYN, N. Y. Bd. Educ., Bureau Constr., 42-15 Crescent St., Long Island City 1, N. Y. Bids Dec. 10. CD 12/15, under LB.

▲ **Rosewood Gardens Homes**, c/o Trylon Realty Co., 98-89 Queens Blvd., Forest Hills, N. Y. Owner Builds. $2,000,000. 150 HOUSES, tract off Northern State Parkway near Exit 35, HICKSVILLE, N. Y.

▲ **C. W. C. Constr. Corp.**, 105 Court St., Brooklyn 2, N. Y., CA $1,823,500, general constr.;
Heckler Electric Co., 44 Schenectady Ave., Brooklyn 13, N. Y., CA $597,700, electrical work for new addn. to and modernization existing bldg. of Williamsburg Vocational HIGH SCHOOL, Bushwick Ave., Siegel and McKibbens Sts., BROOKLYN, N. Y. Bd. Educ., Bureau Constr., 42-15 Crescent St., Long Island City 1, N. Y. Bids Dec. 9. CD 12/13, under LB.

▲ **John Rosenblum, Inc.**, 1860 Broadway, New York 23, N. Y. CA $1,934,000, general constr. JUNIOR HIGH SCHOOL 166, Van Sicklen Ave. and Linden Blvd., BROOKLYN, N. Y. Bd. Educ., Bureau Constr., 42-15 Crescent St., Long Island City 1, N. Y. Bids Oct. 29. CD 11/3, under LB.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
February 4 Tennessee
STREETS AND ROADS
January 26 Louisiana February 4 Tennessee

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† **Thompson & Street**, 47 Trinity Ave. S.W., Atlanta, Ga., LB, $3,415,453, three warehouses and railroad to warehouse, Robins Air Force Base, ENG-09-133-55-28, MACON, GA. U. S. Eng., 200 E. St. Julian St., Savannah, Ga. Bids Dec. 28. CD 12/21.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **M. A. Mace**, Fairfax, Va., Owner Builds. $7,000,000. constr. between 400 and 500 brick detached HOMES near Lake Barcroft and Columbia Pike, FAIRFAX, VA. Harry Ormston, South Langley Lane, McLean, Va., archt.

▲ **Degive, Dunham & O'Neill**, 1478 Mescalin St. N.W., Atlanta, Ga., LB, $2,053,000. Continuing EDUCATION CENTER, University of Georgia Campus, ATHENS, GA. Bd. Regents, University System of Georgia, 20 Ivy St., Atlanta, Ga. Bids Jan. 7. CD 7/23.

▲ **Arnold Constr. Co.**, Murray Bl., Palm Beach, Fla., CA $3,547,977 MEDICAL SCHOOL for University of Florida, GAINESVILLE, FLA. State Bd. Control Education Bldg., Florida State University, Tallahassee, Fla. Bids Jan. 5. CD 8/11, under CA.

▲ **R. F. Farnsworth & Co., Inc.**, 1515 S. Salcedo St., New Orleans, La. LB $6,645,000. 10 story, bsmnt., CIVIC CENTER and CITY HALL, NEW ORLEANS, LA. City, Bureau Purchasing, 302 City Hall, New Orleans, La. Bids Jan. 11. CD 12/2.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
February 1 Indiana February 1 Wisconsin
STREETS AND ROADS
January 26 Indiana February 1 Wisconsin

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **W. J. Meagher & Sons, Inc.**, 1300 S. Water St., Bay City, Mich., CA $3,407,752, $4,500,000. Clague Rd. water intake and line, 13,000 ft. to shore;
Square & Marra Constr. Co., 4537 Mayfield Rd., South Euclid 21, O., CA $1,219,560, 8 ft. pipe from Clague Rd. water intake line to Clague Rd. pumping station, rein.-con. CLEVELAND, O. City, Div. Water & Heat, City Hall, Cleveland, O. Bids Jan. 7. CD 1/12 under LB.

▲ **INDIANA**—Indiana Toll Road Comn., 309 W. Washington St., Indianapolis, Zone 4,
Peter Kiewit Sons Co. & Condon-Cunningham Co., 229½ W. Washington St., Indianapolis, Ind., CA, $3,994,031, Contract C-13 and C-14, Indiana East-West Toll Road in Porter Co. Bids Dec. 15. CD 12/20, under LB.

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Falsework for Sawmill River Parkway overpass at Yonkers, New York, consists of four bents of 60-foot span and center height of 21 feet. Designed by New York Department of Public Works. General contractors: Lenri, Inc. and Wm. P. Bergan, New York City; fabrication and erection by Timber Structures, Inc.

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Local Representatives throughout the United States and Canada

▲ **O. W. Burke Co.**, 1032 Fisher Bldg., Detroit, Mich. CA $2,248,000. sewage treatment plant, DETROIT, MICH. Bd. Water Comrs., Alfred J. Simpson, pres., Water Bd. Bldg., 735 Randolph St., Detroit 26, Mich. Bids Jan. 5. CD 11/24.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Frank Messer & Sons, Inc.**, 4612 Paddock St., Cincinnati, O., CA $1,881,600. general constr. Mershon AUDITORIUM, at Ohio State University, COLUMBUS, O. State Dpt. P. Wks., State Dpts. Bldg., Columbus, O. Bids Dec. 21. CD 1/11, under LB.

▲ **South Gary Homes, Inc.**, 541 Washington St., Gary, Ind., Own Forces, $3,500,000. 360 HOMES, GARY, IND.

▲ **Eastgate Homes, Inc.**, 541 Washington St., Gary, Ind., Own Forces, $2,000,000, 200 HOMES, HAMMOND, IND.

▲ **G. W. Lindstrom**, 2155 Farrell Ave., Park Ridge, Ill. Own Forces. $1,800,000, 200 HOMES, Dempster and Vernon Sts., near DES PLAINES, ILL. Ekroth, Martorani & Ekroth, 343 S. Dearborn St., Chicago 4, Ill., archts.

▲ **Charles B. Johnson & Son**, 6 N. Michigan St., Chicago 2, Ill., CA $3,300,000, 325,000 sq. ft. FACTORY, LINCOLNWOOD, ILL. Ditto Inc., corner Harrison and Oakley Aves., Lincolnwood, Ill. Bids Nov. 30, awarded Jan. 5. CD 11/4.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES

January 28 Missouri

STREETS AND ROADS

January 28 Missouri, North Dakota

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **Northern Natural Gas Co.**, 2223 Dodge St., Omaha, Neb. Owner Builds. $7,890,000, gas pipe lines covering considerable part of South Dakota extending from Sioux Falls to Aberdeen and taking Mitchell, Watertown, Madison, Brooklyn, Aberdeen and many smaller points, SOUTH DAKOTA. F. B. Rabb, c/o owner, ch engr. CD 10/9/52.

▲† **Nilson-Smith Constr. Co.**, 214 Fifth Ave. S., Great Falls, Mont., and **Northwestern Engineering Co.**, 1311 St. Joe St., Rapid City, S. D. LB $4,784,819, est. $5,081,543. 45,000 sq. yd. cement concrete runway exten., 163,000 sq. yd. cement concrete apron, 30,000 sq. yd. asphaltic concrete taxiway and structural steel alert hangar at Great Falls Air Force Base, ENG-45-108-55-85, GREAT FALLS, MONT. U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash. Bids Jan. 7. CD 12/30.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Steenburg Constr. Co.**, 1371 Marshall Ave., St. Paul, Minn. CA Approx. $2,000,000. 27-store Rose Plaza SHOPPING CENTER, Snelling Ave. and Hy. 36, ROSEVILLE (P. O. ST. PAUL), MINN. Rose Building Corp., D. Rees, pres., 718 Second Ave. S., Minneapolis, Minn. G. R. Sauers Co., 1550 W. Larpenteur Ave., St. Paul, Minn., engr.-archt. CD 10/8/52, under Allied Stores, Inc., as owner.

▲ **J. T. Commerford**, 1648 Ford Parkway, St. Paul, Minn. and **Lyle Murray**, 5720 Wayzata Blvd., Minneapolis, Minn. Owner Builds. $3,500,000. HOUSING and SHOPPING CENTER, Hudson Rd. in area bounded by East Ave., Ruth and Conway Sts., ST. PAUL, MINN. Ellerbe & Co., E. 505 First National Bank Bldg., St. Paul, Minn., archts. CD 6/16.

▲ **Skogman Constr. Co.**, 105 10 St. N. E., Cedar Rapids, Ia. Owner Builds. $5,500,000. HOUSING DEVELOPMENT, CEDAR RAPIDS, IA.

▲ **Flett Constr. Co.**, 4325 Troost Ave., Kansas City, Mo. CA 1 and 2 story STORE, OFFICE and roof parking proj. 18 and Baltimore Ave.-Main St., KANSAS CITY, MO. Oppenheimer Industries, c/o Harold L. Oppenheimer, 1615 Baltimore Ave., Kansas City, Mo. (Correction—cost, 1st unit $150,000, total $1,500,000). CD 12/23, under CA.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES

February 19 Oregon

STREETS AND ROADS

February 19 Oregon

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **H. K. Ferguson Co.**, 411 W. 5 St., Los Angeles, Calif., CA, $2,500,000. RESEARCH LABORATORY, LIBRARY and SHOPS, etc., ANAHEIM, CALIF. Richfield Oil Co., 555 S. Flower St., Los Angeles, Calif. Bids Nov. 12, awarded Jan. 10. CD 10/22.

(Proposal Advertisements see pp. 82 to 84)

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This unique ore-loading wharf designed in Plastiment-concrete by Frederic R. Harris, Inc., Consulting Engineers of New York, for the Aluminum Company of Canada's gigantic Kitimat project, was cast on its side, floated into place and tilted 90° into final position.

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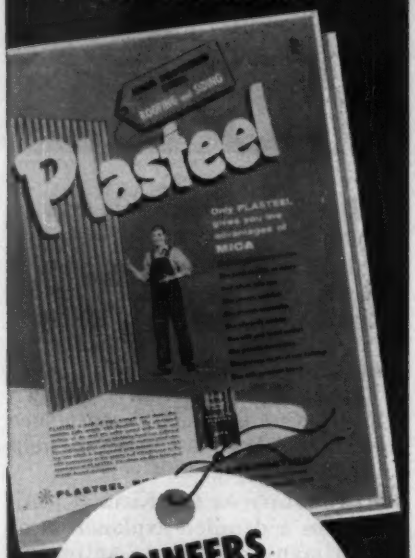

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UNIT PRICES

Road Cost per Mile in Africa

Road costs in underdeveloped areas, combined with variations due to differences in terrain or physical features come from the East African Association of Engineers via The International Road Federation Ltd., London.

An overall cost of £15,000 a mile includes bridges but not engineering fees for the Namanga-Taveta road just south of the Kenya-Tanganyika border. This has a formation width of 30 ft and a blacktop 18-ft carriageway between flush margin stones. It is designed to carry traffic safely at 60 mph, normal wheel loads up to 7,000 lb and higher wheel loads at less frequency. Maximum gradient is 1 in 15 and sight distances are 600 ft.

Cost per mile

Namanga-Taveta Road, East Africa

Miles from Namanga	Earthworks & sub-base	Base-course & surfacing	Drainage	Bridges	Total/
	£	£	£	£	£
0-38	2,225	3,265	1,370	250	7,110
38-64	4,480	3,745	2,915	.....	11,140
64-80.5	5,295	4,040	3,915	4,440	17,690
80.5-104.5	2,170	3,210	780	275	6,435
104.5-113	3,775	3,510	1,400	7,040	15,725
113-116	3,410	6,600	3,920	2,690	16,620*

/ Add £1,165/mi for "preliminaries and general" and £3,960/mi for the effect of cost rises, devaluation and currency fluctuations, a total of £5,145 (April, 1954).

*Includes two roundabouts.

Indiana Sewerage Is Under Estimate

Frankfort, Ind., opened 16 bids Oct. 27 on sewers and nine on additions to a treatment plant. Low base bids totaled $770,190, 13% less than the estimated $889,121. Consulting engineers are Paul J. Kleiser & Associates.

Engineering Construction Corp., 8% under second-low bid on Contract "A," has 365 days to complete piping, manholes, and miscellaneous work. Curry Construction Co. under Contract "B" has 380 days to add to and remodel an existing treatment plant.

With 1950 population at 15,000, the plant's design population is 35,000; flow 3.5 mgd. Its new structures will include primary settling basin 42x92 ft, final settling basin 18x75 ft, 2-story and basement sludge process building 20x50 ft, 50-ft diameter digestion tank.

Minimum wages are: $3.00 per hr to operating engineers, $2.50-$3.00 to skilled labor. Semi-skilled labor gets $2.20 plus $0.75 welfare; common $1.95 plus welfare.

Bidders include:

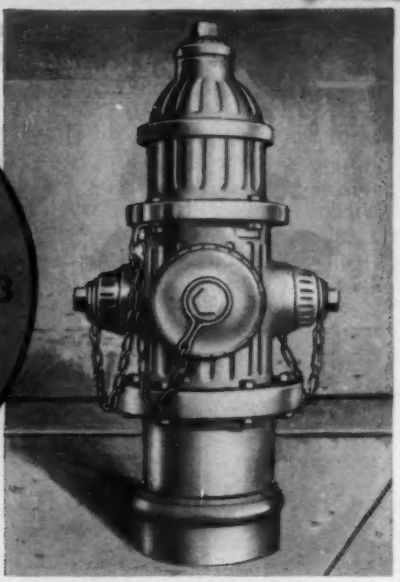
1C Engineering Constr. Corp., Logansport, Ind. $277,190*
2 Excavating Engineers Inc., Marion, Ind.... 300,049
16 Raleigh Burk, Indianapolis, Ind..... 594,914
EE Paul J. Kleiser & Assoc., Terre Haute, Ind. 350,141

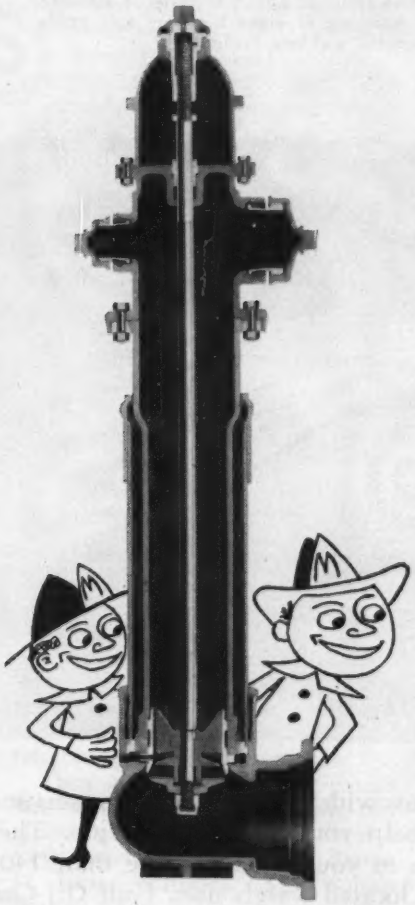
Bids: 10-27-54 Item, Contract "A"	Unit	Quantity	Unit Prices 1 C	2
Furnish only				
VCP sew 12" SS	lf	920	$1.07	$1.188
ES, fs	lf	350	1.60	1.67
10" SS	lf	10,300	0.83	0.924
ES	lf	2,000	1.11	1.17
8" SS	lf	46,000	0.60	0.616
ES	lf	1,500	0.83	0.84
Wye, 3' long, 6x8"	lf	1,300	0.873	0.821
6x10"	lf	250	1.31	1.232
6x12"	lf	20	1.683	1.584
Exc, lay & backfill				
VCP 12" at 0-8'	lf	280	2.50	1.65
8-10'	lf	200	2.50	2.21
10-12'	lf	440	2.75	2.58
12-14'	lf	350	3.00	2.94
10" at 0-8'	lf	4,600	2.00	1.65
8-10'	lf	2,400	2.00	2.21
10-12'	lf	3,800	2.20	2.58
12-14'	lf	1,000	2.20	2.94
14-16'	lf	430	2.50	3.67
16-18'	lf	70	3.00	5.73
8" at 0-8'	lf	22,000	1.70	1.65
8-10'	lf	17,600	1.70	2.21
10-12'	lf	6,600	1.90	2.58
12-14'	lf	1,200	2.00	2.94
14-16'	lf	100	2.50	3.67
Exc, lay, bkfl & CIP				
CIP 8" at 0-8'	lf	180	4.00	5.12
8-10'	lf	100	5.00	5.73
force main	lf	1,650	3.60	5.08
Brick manholes, std				
Depth 0-8'	ea	103	240.00	223.75
8-10'	ea	64	290.00	236.00
10-12'	ea	34	338.00	273.75
12-14'	ea	6	360.00	298.75
14-16'	ea	2	430.00	323.75
16-18'	ea	1	485.00	418.50
Miscellaneous				
Repair 15" creek crossg.	ls	1	5,000	1,485
2 MH	ls	1	2,500	1,000
F&I 8" 1/8 bends	ea	500	2.00	1.64
VC riser pipe	lf	600	1.75	0.4095
Conc "C" in cl 2 cradle	cy	100	25.00	12.50
3 encase.	cy	10	35.00	12.50
Wood sheeting	Mfbm	6	300.00	150.00
Spec fill material	cy	200	2.00	1.25
Rock exc	cy	50	25.00	10.00
Cr stone or gravel	cy	3,000	1.75	2.40
4" farm underdrain tile	lf	1,000	0.45	0.15
Bit pvmt replace	sy	12,000	1.50	3.00
9" RC pvmt "A"	sy	1,400	9.00	5.357
Conc sidewalk repl, 4"	sy	400	5.40	4.375
Alternates				
Spec jt matl in lieu of cement grout slip seal jt,p 12"	lf	.....	0.20	No bid
10"	lf	.....	0.15	.....
8"	lf	.....	0.10	.....
Segmental conc block in lieu brick for MH	vf	.....	4.00	.....
"B" MH cov in lieu "A"	MH	.....	5.00	.....

1C Curry Constr. Co., Bloomington, Ind..... $493,000*
3** The Welsbach Corp., Philadelphia, Pa..... 498,000
9 L. I. Griffin & Sons, South Bend, Ind..... 599,643
EE Paul J. Kleiser & Assoc., Terre Haute, Ind. 538,980

Item, Contract "B"	Unit	Unit prices 1 C	3**
Sewage treatment plant	ls	$454,000	$448,000
Pump station NW	ls	18,000	25,000
SE	ls	21,000	25,000
Alternates			
Aluminum in lieu brick digester walls	ls	No bid	No bid
Wood doors for util bldg	ls	−1,200	.....
Insul brick side panels, Flintkote	ls	−700	.....
Blast furnace slag	ls	No change	.....
Supplementary items			
Conc in place "A"	cy	75.00	85.00
"B"	cy	72.00	65.00
"C"	cy	30.00	40.00
Gravel or cr stone fill	cy	3.50	5.00
Reinf steel	lb	0.15	0.15
Exc, rock	cy	18.00	15.00
earth	cy	2.00	3.50

*Base bid.
**Second-low bid is irregular.





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Stuffing Box Plate. Cast integral with the nozzle section, eliminates an extra part and a flange joint. A stronger, safer, leakproof construction.

Operating Thread. The stuffing box plate prevents water and sediment from reaching the operating thread. No rust can form. No ice can jam it in cold weather.

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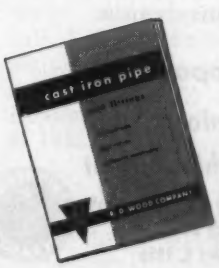

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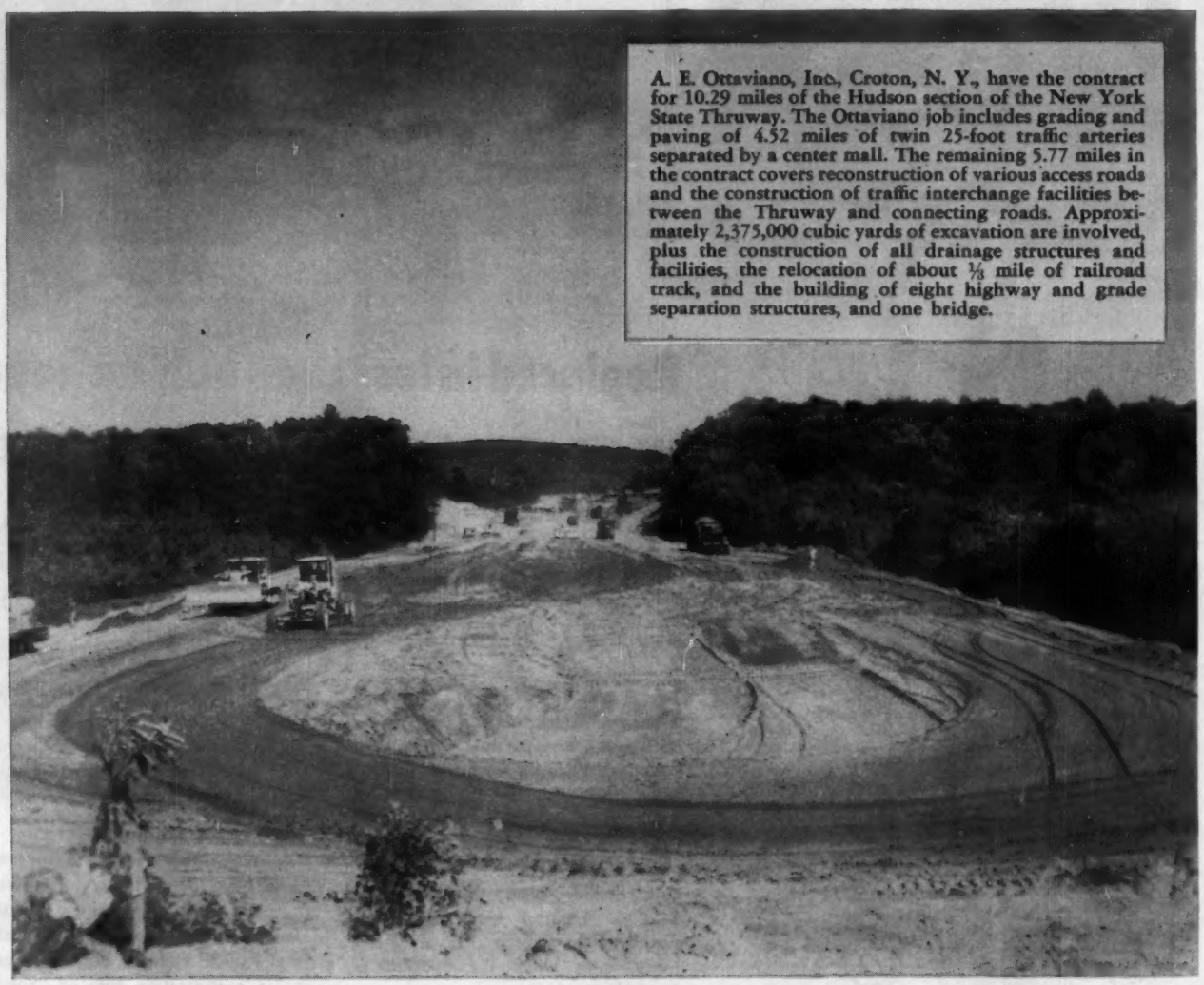

A. E. Ottaviano, Inc., Croton, N. Y., have the contract for 10.29 miles of the Hudson section of the New York State Thruway. The Ottaviano job includes grading and paving of 4.52 miles of twin 25-foot traffic arteries separated by a center mall. The remaining 5.77 miles in the contract covers reconstruction of various access roads and the construction of traffic interchange facilities between the Thruway and connecting roads. Approximately 2,375,000 cubic yards of excavation are involved, plus the construction of all drainage structures and facilities, the relocation of about ⅓ mile of railroad track, and the building of eight highway and grade separation structures, and one bridge.

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THE LONGER LOOK:

Trend to bigger houses is shown in detail by new government figures. The three-bedroom house is now far ahead

Houses are getting bigger. Most builders have observed this trend in their own areas. New government statistics now show just how strong the trend has been throughout the United States.

• Almost 60% of the nonfarm one-family houses started in the first three months of 1954 had three bedrooms and another 5% had four or more. By comparison, of the houses started in the first half of 1950, only 33% had three bedrooms and 1% more than three (chart, below).

• The two-bedroom house which dominated the new-homes market in the first half of 1950 accounted then for 65% of the starts. It slipped to only 32% of the starts in the first quarter of 1954.

• In all sections of the country, at least 55% of the new homes started in the early months of 1954 had three or more bedrooms. In 1950, these larger houses accounted for as many as 40% of the starts only in the northeast and northwest areas.

• Average floor area of new single-family houses in the first quarter of 1954 was 1,140 sq ft. In the first half of 1950, the average was only 983 sq ft. The 1954 average size, by the way, represents a return virtually to the prewar 1940 average of 1,177 sq ft.

• Smaller size prevails in dwelling units in multi-family structures (five or more families). In such structures started in the first quarter of 1954, fewer than 14% of the units had three or more bedrooms, 49% had one bedroom and 11% none.

These new statistics on the characteristics of new housing in the first quarter of 1954 are the result of a survey conducted by the U.S. Bureau of Labor Statistics. The sample covered about 5,000 residential projects with more than 30,000 units. Rough comparisons with the first half of 1950—the record year for housing starts—can be made from the Materials Use Survey, published by the Housing and Home Finance Agency in 1952.

• **The vanishing basement**—Larger house sizes, however, have not restored the popularity of basements. Only 36% of single-family houses started in the first quarter of 1954 had full basements, the same as in the first half of 1950. And there was little change in the number with partial basements—5% in 1954 compared with 3% in 1950. In the South and West, about three-fourths of the new houses in early 1954 had no basement at all.

Basic external wall construction also seems to have undergone little change. In 1950 89% of the new houses had wood frames, the same percentage as in 1940. Masonry provided the basic external wall construction in 11%. In 1954 masonry was reported for 13% of the single-family houses and wood frame for nearly all the rest. Masonry is most popular in the South (19%) and least popular in the Northeast (8%).

• **Aluminum window frames**—In window frames, there has been a noticeable shift to aluminum. In early 1954, aluminum was reported for all or a majority of frames in 18% of the one-family houses, up from only 5% in 1950. Steel dropped from 22% in 1950 to 19% in 1954, and wood from 69% to 61%.

Masonry construction dominated the multi-unit structures started in the first quarter of 1954, accounting for 53%. In the Northeast the percentage was 88, with 44% solid brick and another 44% brick facing. In the north central and western regions, however, about 90% were reported to be of frame construction.

Metal window frames also were more popular in multi-unit structures 29% reporting steel and 27% aluminum frames.

• **Reasons**—The move to bigger houses—roughly from one-third of the starts having three or more bedrooms in 1950 to two-thirds in early 1954—can be attributed to a combination of factors. Probably the most important are:

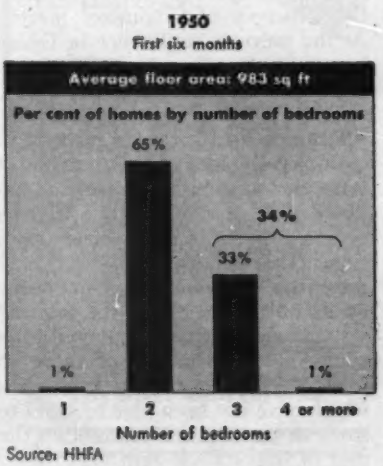
Bigger families. The postwar baby boom hit a new high in 1954, the first year when more than four million babies were born in the United States. The arrival of second, third and fourth children has made a lot of two-bedroom houses inadequate.

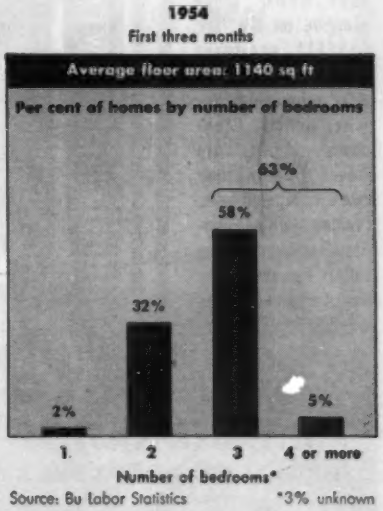
Higher incomes. The number of families with incomes of $5,000 and over increased 50% in the five-year period beginning with 1949, according to estimates by MacFadden Publications, Inc. This has enabled many families to upgrade their housing to bigger homes.

Better bargains in housing. Despite the increased size and improved quality of houses, builders are still able to construct them at prices that attract a wide market. The average (median) selling price of single-family houses started in the first quarter of 1954 was only $12,300, and 70% were built to sell at less than $15,000.

(*B&F continued on page 78*)

Houses are getting bigger:





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Clay Report Gets Going-Over At Highway Finance Meeting

Chamber of Commerce conference serves as sounding board, indicating points on which opposition is developing

The Clay Committee's recommendations for solution of our highway problem are not going to have clear sailing in Congress, even though the Clay program, with some modifications, is likely to be adopted. Also it may be another two years before most of the states will be able to fall into line—unless state legislatures are called into special session. Meanwhile, unless Congress decides on the Clay program quickly, toll-road financing is going to slow down for awhile.

These are the conclusions to be drawn from discussions at the two-day conference on highway finance held in Washington last week under the auspices of the U.S. Chamber of Commerce. Participating were state and federal highway officials, congressmen, highway engineers and contractors, traffic and safety experts, and representatives of citizens' groups and of industries with a stake in the highway problem.

The meeting was well timed, for the Clay committee had only just presented its report to President Eisenhower (Page 23). And, it served to indicate the sources of potential opposition to the program.

• **The revenue principle**—In the first place, the principle of backing federal securities with the gas-tax revenue has already been attacked by Senator Byrd, Virginia's conservative Democrat. But it is significant that this "revenue principle" was almost universally accepted by those attending the Chamber of Commerce meeting. At the previous conference in December 1953, however, the idea aroused considerable controversy.

• **Refunds**—In the second place, it was clear that the idea of giving refunds to states for already-completed and proposed toll roads on the interstate system is going to get a lot of opposition. This will come from: (1) The American Automobile Assn., which wants no tolls at all on the interstate system, and is strongly opposed to encouraging construction of more toll roads. (2) Congressmen from states which have not been able to build toll roads or up-to-date free roads on their part of interstate system.

It is likely that such opposition to refunds will result in a compromise—the percentage of refund will be cut down. But the refund principle is not likely to be eliminated entirely. The reason is entirely practical: Unless some credit is given to states that build toll roads, a great many existing plans would stop abruptly. The roads would eventually be built as free roads, of course. But there would be delays—a year, 18 months, perhaps longer. And the Administration is anxious to avoid delay.

• **Toll-road effect**—In the third place, the Clay program already is getting opposition from members of toll-road commissions. H. E. Bailey, general manager of the Oklahoma Turnpike Authority, offered a counter-proposal at last week's conference. He suggested a national turnpike authority that would have exclusive responsibility for development of the interstate system, both through state turnpike agencies and directly. Federal funds could be used to strengthen the credit of marginal toll-road projects—an idea ruled out by the Clay program.

An approach of the sort Bailey proposed would have the effect in some states of cutting state highway departments completely out of the interstate highway program. Under the Clay program, the Federal Highway Corp.

Spending and Financing Schedule For Interstate Highway Program

Year	Construction expenditures (in millions) Total	From federal gas revenues & oil tax revenues	From bond sales	Possible bond maturities in years
1956	$1,000	$500	$500	11
1957	2,000	500	1,500	13
1958	2,500	600	1,900	15
1959	2,700	500	2,200	17
1960	2,900	500	2,400	19
1961	2,900	500	2,400	20
1962	2,900	500	2,400	21
1963	2,900	400	2,500	21
1964	2,700	400	2,300	22
1965	2,500	365	2,135	22
	$25,000	$4,765	$20,235	

would operate through state highway departments. But in most states where toll roads exist, they are operated more or less independently of state highway departments. It has long been obvious that large-scale federal aid to the interstate system might create a pitched battle between toll-road agencies and highway departments.

• **What about the states?**—The Clay report proposes that the federal government pay for about 30% of our total highway needs of about $101 billion over the next decade. But in last week's discussion, it was often remarked that the Clay report was discreetly silent on how states and local governments can deal with the problem of financing their share of highway construction, beyond what had already been considered for the next 10 years.

The Chamber of Commerce discussions also made it quite plain that the worst part of the highway program right now is in U. S. cities. The Clay report offers little to solve downtown congestion; and this aspect of the highway problem appears likely to get worse.

Though the Clay report was silent about the role of states and local governments, some observers at the Chamber of Commerce meeting were ready with advice to fill in this gap. Most states will have to sell revenue bonds based on their gas taxes to get the money to meet their highway needs. And for quite a few, the arithmetic of the situation makes it apparent that they will have to raise their gas taxes in order to get sufficient security to sell all the bonds they need.

Alcan Will Sell $24 Million Of Surplus Kitimat Equipment

The Aluminum Co. of Canada has announced a huge sale of surplus construction equipment, believed to be the largest ever undertaken by private industry. Through its sales agent, S&S Machinery Co., of Brooklyn, N. Y., Alcan will dispose of over $24 million of construction and mining equipment used during the past few years in building its vast hydroelectric and aluminum smelter project at Kitimat in British Columbia.

With the initial phase of this job now over, a tremendous amount of equipment is available: anything from mammoth shovels and cement batch plants to compressors, locomotives, and helicopters. The equipment is available for inspection at the site, either directly or through engineering agents.

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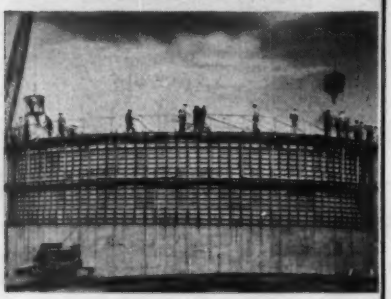

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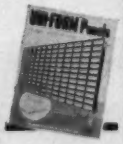

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Ribicoff Steps in

New governor checks into Connecticut's Expressway

Connecticut's new governor, Abraham A. Ribicoff, has stepped right into the financing of the Connecticut Expressway. The governor wants a re-appraisal, and has appointed a group of financial experts to do the job. The committee includes three officers of Hartford life insurance companies, a savings banker, and an officer of a Wall Street commercial bank.

There are several things Ribicoff objects to:

- The state has pledged its gas-tax revenue to support Expressway bonds for 40 years. This, of course, limits the state in its use of the gas-tax revenues for other purposes.
- Construction cost of the Expressway is relatively high—$2,461,000 per mile, while the proposed toll rate of about 1-cent per mile is relatively low compared to other toll roads. The per-mile cost is certainly explained in part at least by the expense of land acquisition. But outside financial experts believe that the low toll rate does seem to give some justification for Ribicoff's complaint that out-of-state drivers are being favored at the expense of Connecticut residents.
- Instead of higher tolls, the state is responsible for maintenance costs of about $2.5 million per year, and plans to build access roads amounting to about $18 million. Ribicoff believes this also tends to favor out-of-state drivers.

The governor wants to consider whether or not revenues from all toll roads and bridges in the state could be pledged against the Expressway bonds instead of the state gasoline tax. As part of this, tolls on the Merritt and Wilbur Cross Parkways might be increased.

Busy, Competitive Year Seen For Equipment Distributors

Business will be good for construction equipment distributors this year, but competition will be tougher. That's the consensus of opinion among dealers, according to a survey just made by Associated Equipment Distributors.

AED finds general optimism about construction activity and sales of new equipment. New York, New Jersey, and Pennsylvania are the only areas where forecasts of construction activity tend to be conservative. Most distributors expect this year's sales to make an upswing, coming back into line with the general construction picture. This attitude is general in all areas except New York and the Pacific Northwest.

Dealers agree that competition in 1955 will be the toughest in years. Many are worried that profits will shrink as a result. While they report that inventories of new equipment are normal, used equipment in inventory is already above normal. They feel that used-equipment prices will tumble even lower as the months go on. The new depreciation schedules allowed by the new tax law are making used machinery less attractive to buyers, and this effect already has been noted in many parts of the U.S. The only bright spot in the used-equipment picture is found in the Middle Atlantic states.

Starts Were Over 1.2 Million In 1954, and Boom Rolls on

Housing starts for 1954 totaled 1,215,000, according to estimates made last week by the Bureau of Labor Statistics. That's the second highest in history and 10% above 1953. Nearly all the units started were privately owned. Public starts dropped to only 19,400 in 1954, down 45% from 1953 and the smallest total since the Housing Act of 1949 went into effect.

In December, starts declined seasonally to 89,600. However, this was a record for the month, and also 40% above December 1953. Seasonally adjusted, the December starts were at an annual rate of 1,473,000, well above the record annual total of 1,396,000 in 1950. That means the homebuilding boom is still rolling in high gear as the new year commences.

Industrial Builders Look Forward to a Good Year

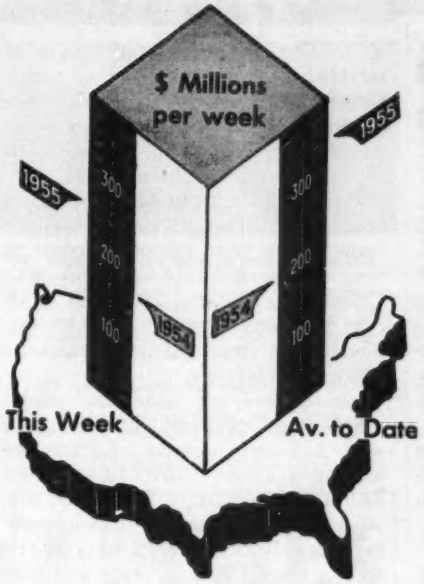
This year should be "another good year" for industrial builders, though not as busy as the record-breaking period just after Korea. This is the forecast made by engineers and contractors who attended last week's annual meeting of the National Constructors Assn. in New York City.

The association is made up of firms engaged in design and construction of industrial plants—primarily chemical plants, steel mills, oil refineries, and power plants.

John F. O'Connell, president of the group, said that volume of new industrial contracts has been increasing since the start of the fourth quarter. (ENR forecasts a 6% gain in industrial contracts this year.)

Activity This Week

As reported to ENR
(In millions of dollars)



Amount of contracts let

	This Week	Cumulative 3 wks 1955	1954	% chge
Federal	$10.2	$135.8	$52.0	+160
State and municipal	83.2	255.1	271.5	−6
Total public	93.4	390.9	323.5	+21
Total private	163.8	645.9	271.8	+138
U. S. total	$257.2	$1,036.8	$595.3	+74

Contracts by type of work

Waterworks	$8.3	$23.1	$12.8	+80
Sewerage	4.4	19.5	12.0	+63
Bridges	4.5	30.4	24.0	+27
Highways	22.6	96.1	90.9	+6
Earthwork, waterways	4.9	15.6	26.7	−42
Buildings:				
Public, excl. hsg.	35.1	141.6	112.9	+25
Housg., public	1.6	2.2	17.3	−87
Housg., private	107.9	343.2	141.0	+143
Commercial	23.9	71.0	50.5	+41
Industrial	20.0	209.9	71.7	+193
Unclassified	24.0	84.2	35.5	+137
Total	$257.2	$1,036.8	$595.3	+74

NOTE: Minimum size projects included are (effective Jan. 1, '55): Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,00; other buildings, $344,000.

New capital for construction

(millions of dollars)

	Week of Jan. 13 1955	Cumulative 2 wks 1955	% chge '54-'55
Corporate securities	$33.1	$39.9	−48
State and municipal:			
All except housing	39.2	59.3	+1
Housing	7.2	10.6	+1078
Federal loans	4.3	6.2	+68
Federal aid	...	...	...
Total non-federal	$83.8	$116.0	−18
Federal appropriations:			
In U. S.	...	...	...
Outside U. S.	...	...	...
Total new capital	$83.8	$116.0	−18

ENR cost and volume indexes, 1955

		Base years = 100 1913	1926	1949
Construction cost	1/13	645.17	310.13	135.25
	12/30/54*	644.32	309.72	135.07
Building cost	1/13	458.76	247.99	130.41
	12/30/54*	457.91	247.53	130.17
Volume	Dec.	464	189	134
	Nov.	522	213	151

* Official ENR index for Jan. 1

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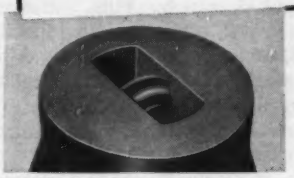

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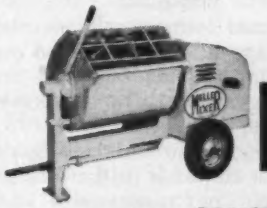

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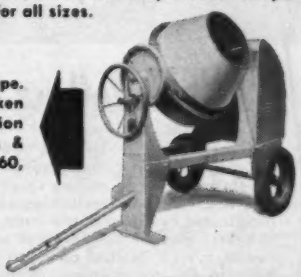

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Western Bargaining

Puget Sound is losing Pacific Northwest lead

Collective bargaining negotiations, underway in the Pacific Northwest construction industry, no longer look to the Puget Sound area for the cue either in timing settlements or in the scope of demands. This year, agreements were reached with operating engineers in both Portland and Spokane while Seattle negotiations were still in progress.

Current negotiations establish no particular pattern. Differentials between traditionally higher rates in the Seattle-Tacoma area and rates in other areas are diminishing. Interest in fringe benefits and extension of agreement coverage continues.

Significant observations emerging from negotiations are:

• Stiff contractor resistance to welfare programs is developing in the Spokane area. Contractors have become increasingly price conscious and feel that "negotiations must consider the best interests of the industry, rather than individual unions."

• Contractors in the Seattle area are seeking two-year contracts wherever possible. Period of duration has varied as to unions and areas and in many cases contracts have run for three years. Both operating engineers and contractors in the Spokane area have expressed dissatisfaction over previous three-year contracts and prefer a shorter period.

• Portland contractors foresee both building and heavy construction eventually coming under one wage scale and one agreement. The gap between the two has continued to close.

• Contractors in eastern Washington expect emphasis in the future on negotiation of maintenance rates. They believe "maintenance by contract" is approaching as one means of keeping craftsmen and employers busy.

An ENR roundup reflects the following picture in three major areas.

• **Oregon**—Negotiations between laborers and AGC have been reduced to new contracts in both heavy and building construction. New rates for heavy construction are $2.13 plus 10 cents health and welfare (increased from $2.10 and .07½). For building construction, they are $2.23, inclusive of 10 cents in lieu of health and welfare (an increase from $2.17 and .07). The union has the option of establishing a welfare fund to which the 10-cent payment may be made. Contracts are for three years, with reopening for wages late in 1955 and 1956, incorporate transportation allowances now paid to AFL carpenters, and make no changes in overtime pay (now double time except for concrete work which is at 1½ on weekdays). Operating engineers have won a 5½-cent increase. Negotiations with carpenters and structural ironworkers are nearing completion.

• **Spokane**—Operating engineers have won a 5-cent increase. Lathers are seeking a 25-cent hike, 10 cents for health and welfare, a 7-hour day and an apprentice program at employers' expense. Bricklayers are seeking increases from 15 to 21 cents and plasterers an increase of 12½ cents. Ironworkers have named no increase and are striving for area-wide bargaining.

• **Seattle**—Wage rates and fringe benefits continue to be relatively higher in the Seattle area but the differential grows smaller. Cement finishers and laborers will continue through 1955 without an increase under existing two-year contracts. Carpenters received a one-cent cost-of-living increase Jan. 1. The Mountain Pacific Chapter of AGC is negotiating with operating engineers, teamsters and structural ironworkers. Wage increases are expected to be held down to a 5-cent level.

Workmen's Compensation Law No Aid to Prime Contractor

A decision of the Arkansas Supreme Court contains bad news for prime contractors—both in Arkansas and other states with similar workmen's compensation laws.

The court ruled that an injured employe of a subcontractor may sue the prime contractor for damages in a common-law tort action. Previous compensation for injuries by the subcontractor's insurer under workmen's compensation does not bar the suit.

Conscious that its decision places a prime contractor under a continuing potential liability, the court noted that relief could come only by a change in the law. For the existing law fails to give the prime contractor the same protection that is afforded the sub.

The prime contractor was The Baldwin Co. which had a contract for construction of a General Motors'

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building. An employe of a subcontractor, Southwestern Electric Co., fell into a pit and was injured. After getting his workmen's compensation benefits from the subcontractor's insurer, he sued Baldwin. And the court saw no reason why he couldn't.

The only time a prime contractor becomes an "employer" with respect to employes of a subcontractor, as the law now stands, is when the subcontractor fails to secure compensation required by the law. In that situation, an employe may recover under the act—but he could not then turn around and sue the prime contractor in a tort action.

Lower California Builders Agree to Union Surveying

Efforts to extend the activities of unionized civil and other professional engineering employes in California (ENR May 13, 1954, p. 28) showed evidence of success with a field survey agreement between Operating Engineers Local 12 and contractors in southern California.

The new agreement covers all field survey work except that performed by certain supervisory and office engineering personnel. It is the first of its kind to be obtained by the local and is a supplement to the basic agreement negotiated earlier this year between the union and four southern California contractor groups—AGC, BCA, HBI and the Excavating and Grading Contractors Assn.

Unlike the basic contract, the supplemental agreement affects only those member contractors who sign it. All members, however, having work falling within its provisions, must become parties to it.

Minimum wage scales established by the agreement are $2.52 for rod and chainmen, and $2.76 for instrumentmen. When instrumentmen perform tasks generally considered those of a chief of party, the rate is $3.05.

The union has had an agreement with the Southern California Civil Engineers and Land Surveyors Assn. since 1950.

Investigate Welfare Funds

Last week Graham Barden, House Labor Committee chairman, described union welfare funds (ENR Dec. 23, 1954, p. 50) as "a very sick patient." The committee's interim report discloses a wide range of "questionable" practices and Barden said the investigation will be continued.

OFFICIAL PROPOSALS

Bids: February 21, 1955

Contract HP-120.006

THE PORT OF NEW YORK AUTHORITY
HOBOKEN-PORT AUTHORITY PIERS
PIER A

Sealed proposals for the construction of Pier A at the Hoboken-Port Authority Piers will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Monday, February 21, 1955, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1112. Documents will be furnished upon deposit of $50.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $50.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to Room 1112, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman
New York, January 20, 1955

Bids: February 3, 1955

New Jersey Turnpike Authority

CONTRACT NO. N-10A

Proposals are invited for Contract No. N-10A which involves the construction of the concrete deck, and other work in connection therewith and incidental thereto, for the Newark Bay Bridge, extending from the East Abutment in the City of Bayonne, Hudson County, to Pier W45, just west of Doremus Avenue in the City of Newark, Essex County, all in connection with the construction of the Newark Bay-Hudson County Extension of the New Jersey Turnpike.

The principal items of work include:

Concrete	18,100 Cu. Yds.
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Erecting Metal Railing	6,800 Lin. Ft.

Proposals will be received at the New Jersey Turnpike Authority, Administration Building, New Brunswick, New Jersey, until 11:00 O'Clock Eastern Standard Time on the morning of February 3, 1955, at which time and place said proposals will be publicly opened and read.

Each bidder must submit with his proposal a Contractor's Financial and Equipment Statement.

Contract documents may be examined during office hours after January 13, 1955, at the office of the Authority and at the office of the Consulting Engineers, Howard, Needles, Tammen & Bergendoff, 55 Liberty Street, New York 5, New York. Contract documents will be furnished upon payment of Fifteen Dollars ($15.00) for each set, upon application to the Authority. Contract documents are not required to be returned, and the payment will not be refunded.

NEW JERSEY TURNPIKE AUTHORITY
Paul L. Troast, Chairman
January 11, 1955

(Continued on following page)

OFFICIAL PROPOSALS
(Continued from preceding page)

Bids: February 8, 1955

Pennsylvania Turnpike Commission
Harrisburg, Pennsylvania

NOTICE TO BIDDERS

Sealed proposals will be received by the Pennsylvania Turnpike Commission, through the Chairman, 11 North Fourth Street, Harrisburg, Pennsylvania, until 10:00 a. m., Eastern Standard Time, the 8th day of February 1955, and immediately thereafter will be taken to the Public Utility Commission's Hearing Room No. 1, North Office Building, State Capitol, Harrisburg, Pennsylvania, and publicly opened and read aloud for the following contracts:

For the construction of structures and the grading, drainage and paving of the Turnpike Section 37-F, part of the Northeastern Extension of the Pennsylvania Turnpike in Bear Creek Township, Luzerne County, Commonwealth of Pennsylvania. This section being situated as follows:

Beginning at a point approximately 2,251 lineal feet southeast of the center line of Legislative Route 933 at Turnpike station 360+00 in Bear Creek Township, Luzerne County; thence in a northerly direction 18,925 lineal feet to Turnpike station 549+25, at a point approximately 6,165 feet northeast of the center line of Legislative Route 169 in Bear Creek Township, Luzerne County, a distance of 3.58 miles.

The approximate quantities of the principal items are as follows:

Class I Excavation	1,330,130 cu. yds.
Class II Excavation	18,009 cu. yds.
Class 2A Excavation	1,782 cu. yds.
Special Subgrade	194,360 sq. yds.
Reinforced Concrete Pavement	119,481 sq. yds.
Class A Concrete	1,695 cu. yds.
Class B Concrete	2,388 cu. yds.
Plain Steel Bars	404,886 lbs.
Fabricated Structural Steel	807,440 lbs.
Median Divider	17,793 lin. ft.

For the construction of structures and the grading, drainage and paving of the Turnpike Section 37-G, part of the Northeastern Extension of the Pennsylvania Turnpike in Bear Creek, Plains and Jenkins Townships, Luzerne County, Commonwealth of Pennsylvania. This section being situated as follows:

Beginning at a point approximately 5,990 lineal feet northeast of the center line of Legislative Route 169 at Turnpike station 547+50 in Bear Creek Township, Luzerne County; thence in a north northeasterly direction through a small equality 19.649 lineal feet to Turnpike station 744+00 at a point approximately 40 lineal feet northeast of the center line of an earth road leading to the Spring Brook Water Company reservoirs, in Jenkins Township, Luzerne County, a distance of approximately 3.72 miles.

The approximate quantities of the principal items are as follows:

Class I Excavation	982,496 cu. yds.
Class II Excavation	16,020 cu. yds.
Class 2A Excavation	2,790 cu. yds.
Borrow Excavation	648,247 cu. yds.
Special Subgrade	161,118 sq. yds.
Reinforced Concrete Pavement	101,990 sq. yds.
Class A Concrete	1,701 cu. yds.
Class B Concrete	3,854 cu. yds.
Plain Steel Bars	588,928 lbs.
Fabricated Structural Steel	1,033,400 lbs.
Median Divider	18,027 lin. ft.

Copies of plans, specifications and other contract documents including cross sections, are on file and open to public inspection at the office of the Pennsylvania Turnpike Commission located at Harrisburg, Pennsylvania, on 21 January 1955. Plans, specifications, cross-sections and other contract documents will be available by this date for inspection or for mailing to prospective bidders. Copies of Specifications for grading, drainage, paving and structures may be purchased from the Pennsylvania Turnpike Commission for the sum of five (5) dollars per copy. Copies of cross-sections may be purchased from the Pennsylvania Turnpike Commission for the sum of fifty (50) dollars per set, for each section.

Plans and contract documents, for each section exclusive of cross-sections and specifications, may be purchased from the Pennsylvania Turnpike Commission for the sum of twenty (20) dollars for each set. No refund will be made for plans returned unless the project is withdrawn from letting by the Pennsylvania Turnpike Commission.

Remittances are payable by check or P.O. money order to the Pennsylvania Turnpike Commission and must accompany requests for drawings, specifications, contract documents, and cross-sections.

OFFICIAL PROPOSALS

The Pennsylvania Turnpike Commission reserves the right to award each section as a separate contract or in a combined contract.

The character and amount of bid security to be furnished by the bidder is stated in the instructions to Bidders.

The Commission reserves the right to waive any informalities in or to reject any or all bids.

No bids may be withdrawn for thirty (30) days after the scheduled closing time for receipt of bids.

PENNSYLVANIA TURNPIKE COMMISSION
James F. Torrance
Secretary and Treasurer
Harrisburg, Pennsylvania
10 January 1955

Bids: February 1, 1955

New Jersey Turnpike Authority

CONTRACT NO. N-26B

Proposals are invited for Contract No. N-26B which involves the construction of the substructure, consisting of twenty-three (23) piers, for a portion of the North Terminal Ramps—Section B, in Jersey City, Hudson County, New Jersey, all in connection with the construction of the Newark Bay-Hudson County Extension of the New Jersey Turnpike.

The principal items of work include:

Open Foundation Excavation	3,800 Cu. Yds.
Treated Timber Piles	17,000 Lin. Ft.
Cast-In-Place Piles	31,000 Lin. Ft.
Concrete	6,125 Cu. Yds.
Reinforcement Steel	330,000 Lbs.

Proposals will be received at the New Jersey Turnpike Authority Administration Building, New Brunswick, New Jersey, until 11:00 O'Clock Eastern Standard Time on the morning of February 1, 1955, at which time and place said proposals will be publicly opened and read.

Each bidder must submit with his proposal a Contractor's Financial and Equipment Statement.

Contract documents may be examined during office hours after January 11, 1955, at the office of the Authority and at the office of the Consulting Engineer, Howard, Needles, Tammen & Bergendoff, 55 Liberty Street, New York 5, New York. Contract documents will be furnished upon payment of Fifteen Dollars ($15.00) for each set, upon application to the Authority. Contract documents are not required to be returned and the payment will not be refunded.

NEW JERSEY TURNPIKE AUTHORITY
January 7, 1955 Paul L. Troast, Chairman

Bids: January 27, 1955

New York State Thruway Authority

TYPE "B" GAS STATION AND RESTAURANT AT WESTMORELAND, N. Y.

Separate sealed proposals covering Construction; Heating, Ventilating and Air Conditioning; Plumbing; Electric; Elevator and Commercial Refrigeration Work, for New York State Thruway Authority, Type "B" Gas Station and Restaurant, Westmoreland, N. Y.; in accordance with Specification Nos. 19221, 19222, 19223, 19224, 19225 and 19226 and accompanying drawings will be received by Henry A. Cohen, Director, Bureau of Contracts and Accounts, Department of Public Works, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., on behalf of the New York State Thruway Authority, until 2:00 o'clock P. M., Eastern Standard Time, on Thursday, January 27, 1955 when they will be publicly opened and read.

Each proposal must be made upon the form and submitted in the envelope provided therefor, and shall be accompanied by a certified check made payable to the Comptroller of the State of New York as agent for the New York State Thruway Authority, of 5% of the amount of the bid as a guaranty that the bidder will enter into the contract if it be awarded to him. The specification number must be written on the front of the envelope. The blank spaces in the proposal must be filled in, and no change shall be made in the phraseology of the proposal. Proposals that carry any omissions, erasures, alterations or additions may be rejected as informal. The Authority reserves the right to reject any or all bids. Successful bidders will be required to give a bond conditioned for the faithful performance of the contract and a separate bond for the payment of laborers and material men, each bond in the sum of 100% of the amount of the Contract. Drawings and specifications may be examined free of charge at the following offices:

State Architect, 270 Broadway, New York City
State Architect, The Gov. A. E. Smith State Office Building, Albany, N. Y.
District Engineer, 109 N. Genesee Street, Utica, New York
District Engineer, 301 E. Water Street, Syracuse, New York
District Engineer, Barge Canal Terminal, Rochester, New York
District Engineer, 65 Court Street, Buffalo, New York
District Engineer, 30 West Main Street, Hornell, New York
District Engineer, 444 Van Duzee Street, Watertown, New York
District Engineer, Pleasant Valley Road, Poughkeepsie, New York
District Engineer, 71 Frederick Street, Binghamton, New York
District Engineer, Babylon, Long Island, New York

Drawings and Specifications may be obtained by calling the Bureau of Contracts and Accounts, Department of Public Works, 14th Floor, The Governor A. E. Smith State Office Building, Albany, New York, or at the State Architect's Office, 18th Floor, 270 Broadway, New York City, and by making deposit for each set as follows: Construction, $30.00; Heating, Ventilating and Air Conditioning, $20.00; Plumbing, $20.00; Electric, $20.00; Elevators, $5.00; Commercial Refrigeration, $5.00; or by mailing such deposit to the Albany address. Checks shall be made payable to the New York State Department of Public Works. Proposal Blanks and envelopes will be furnished without charge.

Dated: 12/22/54

Bids: February 8, 1955

New Jersey Turnpike Authority

CONTRACT NO. N-27B

Proposals are invited for Contract No. N-27B which involves the fabrication and erection of the superstructure steelwork for Section B of the North Terminal Ramps, comprising the Southbound Ramp from Pier SB25 at Tenth Street to its east abutment at Fourteenth Street between Coles Street and Jersey Avenue, and the Northbound Ramp from Pier NB24 at Tenth Street to its east abutment at Twelfth Street between Coles Street and Jersey Avenue, and other incidental work, in Jersey City, Hudson County, New Jersey, all in connection with the construction of the Newark Bay-Hudson County Extension of the New Jersey Turnpike.

The principal items of work include:

Structural Low-Alloy Steel	635,000 Lbs.
Structural Carbon Steel	8,770,000 Lbs.
Furnishing Metal Railing	7,710 Lin. Ft.

Proposals will be received at the New Jersey Turnpike Authority Administration Building, New Brunswick, New Jersey, until 11:00 O'Clock Eastern Standard Time on the morning of February 8, 1955 at which time and place said proposals will be publicly opened and read.

Each bidder must submit with his proposal a Contractor's Financial and Equipment Statement.

Contract documents may be examined during office hours after January 14, 1955, at the office of the Authority and at the office of the Consulting Engineers, Howard, Needles, Tammen & Bergendoff, 55 Liberty Street, New York 5, New York. Contract documents will be furnished upon payment of Fifteen Dollars ($15.00) for each set, upon application to the Authority. Contract documents are not required to be returned, and the payment will not be refunded.

NEW JERSEY TURNPIKE AUTHORITY
Paul L. Troast, Chairman
January 11, 1955

U. S. Government

GOV. OF DIST. OF COL., DEPT. OF HIGHWAYS. Jan. 6, 1955. SEALED PROPOSALS will be recd. in Rm. 404, 499 Pa. Ave., N.W., Wash. 1, D. C., until 2PM, EST, Feb. 4, 1955, and then publicly opened and read for Painting South Capitol Street Bridge over the Anacostia River. Proposal forms, specns. and plans obtainable from Supervisor, Contr. & Bond Section, without charge, Procurement Office, D. C., Rm. 406, 499 Pa. Ave., N.W. (Tel. NA 8-6000, Ext. 2378).

OFFICIAL PROPOSALS
(Continued from opposite page)

Bids: February 1, 1955

Construction of Passenger Station

Construction of a two story passenger station, steel canopy and shelter building, located in the Borough of Dunellen, County of Middlesex, New Jersey, in connection with the Dunellen-Plainfield Grade Crossing Elimination Project, under Order of the Board of Public Utility Commissioners, State of New Jersey

Sealed proposals for the construction of a two story masonry, steel and reinforced concrete passenger station (22'x57'), steel canopy (18'x146'), and shelter building (15'x 42'), adjacent to track elevation work now in progress, will be received by The Central Railroad Company of New Jersey, at the office of the Chief Engineer of the Railroad, located at Jersey City Terminal, Room 44, Foot of Johnston Avenue, Jersey City, N. J., until 1:00 PM EST, Tuesday, February 1, 1955, and then be publicly opened and read.

Proposal forms, drawings, specifications, bond and insurance requirements may be obtained at the office of the Chief Engineer of The Central Railroad Company of New Jersey, at the above address, on or after Friday, January 14, 1955. Drawings and specifications may be obtained upon application at the office of the Chief Engineer on a deposit of Twenty-five Dollars ($25.00) per set. A refund in full will be made to bidders upon return of each set in good condition within 30 days of award or rejection of bids.

This work will be awarded as a general contract and the successful bidder will be required to perform with his own organization not less than 80% of the total value of the contract, except for materials or items of work which require specialized knowledge, craftsmanship, or equipment not ordinarily available in a contractor's organization.

Bids must be made upon the standard proposal forms furnished for this purpose by the Railroad Company and must be enclosed in sealed addressed envelopes bearing, on the outside, the name and address of the bidder and the identity of the contract work covered by the bid, and must be accompanied by a certified check drawn to the order of the Treasurer of The Central Railroad Company of New Jersey, in the amount of Ten Thousand Dollars ($10,000.). Bids and checks not enclosed in sealed addressed envelopes will be considered informal and will not be accepted.

The Railroad Company reserves the right to reject any or all proposals.

S. L. Mapes, Chief Engineer
The Central Railroad Company of New Jersey
Jersey City Terminal, Jersey City 2, New Jersey

U. S. Government

Sealed bids in triplicate for remodeling Congress Street U. S. Post Office, Chicago, Illinois, will be received until 2:00 P.M., CST on Feb. 8, 1955 in Rm. 575 U. S. Court House, 219 South Clark Street, Chicago, Illinois, and then publicly opened in Rm. 575. Two sets of bidding material may be obtained without charge by general contractors desiring to bid the entire project from Public Buildings Service, Rm. 1304 General Services Bldg., Washington 25, D. C., or General Services Administration, Deputy Regional Director, P.B.S. Rm. 575 U. S. Court House, 219 South Clark St., Chicago, Illinois. Additional sets may be secured by depositing $40.00 per set. Checks offered as a deposit must be made payable to the order of the Treasurer, U. S., P. A. Strobel, Commissioner of Public Buildings, General Services Administration.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4307), will be received at Cody, Wyoming, until February 17, 1955, for furnishing labor and materials for: Hanover Pumping Plants No. 1, No. 2, No. 3, and No. 4 and canals and laterals; and Bluff Pumping Plants No. 1 and No. 2 and laterals; Big Horn Basin Division, Hanover Bluff Unit, Wyoming, Missouri River Basin Project. Location near Worland, Wyoming. Principal items are: 76,700 cu. yds. excavation; 580 cu. yds. concrete; 7,990 lin. ft. furnishing and laying concrete pipe; 48,400 pounds furnishing and installing pump manifolds and trashracks; 50,000 pounds installing motor-driven, horizontal pumping units; lump sum furnishing and installing motor-driven, vertical-shaft, turbine-type pumping units; and other work. Completion time 560 days. For particulars, address Bureau of Reclamation, Cody, Wyoming; or Building 53, Denver Federal Center, Denver, Colorado. W. A. Dexheimer, Commissioner.

EMPLOYMENT
AND OTHER BUSINESS OPPORTUNITIES

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

WANTED: TWO structural steel detailers and designers with experience. Positions permanent. P-4962, Engineering News-Record.

BRIDGE—HIGHWAY Engineers—Designers—Draftsmen. For work on bridges, expressways and turnpikes. Location Midwest. Permanent positions with periodic promotions depending on experience and ability. Paid vacations, sick leave, hospitalization and life insurance. Include education, experience, reference and salary expected in application letter. P-4968, Engineering News-Record.

EXPERIENCED ASPHALT Plant operator capable of assuming full charge modern asphalt plant in Northern New Jersey. Send full information as to background and income requirements in first letter to P-5015, Engineering News-Record.

DRAFTSMEN—STRUCTURAL Detailers—permanent positions with medium size structural shop in large city on eastern seaboard. Write fully, stating age, experience, availability, and salary requirements. P-5055, Engineering News-Record.

EXPERIENCED OFFICE Engineer-estimator to work for general contractor. New York-New Jersey area. P-5054, Engineering News-Record.

NEW YORK-New Jersey firm seeks experienced outside construction man as general superintendent-project manager. P-5053, Engineering News-Record.

PROJECT SUPERINTENDENTS — To completely handle in field complete mechanical contract portions of large industrial and institutional building projects. Middle Atlantic States. Give complete details, including projects handled and dollar value, age, references and salary expected. P-5059, Engineering News-Record.

DESIGN ENGINEERS—Men having experience in design and preparation of drawings and reports for Sanitary Sewer, water distribution and municipal-type storm drainage systems. Good pay for qualified men with training and experience. Opportunity for advancement. Furnish full information regarding education, training and experience, age, references and salary required. Replies strictly confidential. P-5082, Engineering New-Record.

GRADUATE ARCHITECT or Engineer interested in the business side of architecture to process and coordinate details in connection with regional shopping centers. Salary open. John Graham and Company, Architects and Engineers, 1426 Fifth Avenue, Seattle 1, Washington.

BRICKLAYER FOREMAN—Must be capable of laying out work and securing production and accept responsibility. Free to travel. Appiy James McHugh Construction Co., 6449 South Park Avenue, Chicago 37, Illinois. Butterfield 8-4100 (Extension 17, for appointment for interview).

SUPERINTENDENT: TOP-flight highway and bridge superintendent wanted by contractor with headquarters in New England. Must be able to produce and have a following of key men. Must be available within 30 days. Liberal compensation for qualified man. P-5085, Engineering News-Record.

STRUCTURAL STEEL Draftsman & Est. must have minimum of 5-10 yrs. experience in structural steel designing and estimating. Starting salary $5-7,000. Good future with structural steel fabricator in Ohio. P-5091, Engineering News-Record.

(Continued on following page)

CONSTRUCTION SUPERINTENDENT—Expanding company has excellent permanent position open for capable, dependable man experienced in building bridges, pile driving, foundations, earth work, and building construction. Estimating experience required. Illinois—Iowa Operations. Give full details, age, education, experience, references, and salary expected, in first letter.

P-5172, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

WANTED
Man to act as
BRANCH MANAGER

In new building for Caterpillar Distributor in Northeastern United States. Must have experience in sales, sales control, parts and service management. Please write and give full qualifications.

P-5041, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

Refinery Construction Superintendent.

Must have minimum 5 years experience in full charge major installations.

Must have full knowledge of Piping, Rigging, Instrumentation, Boilermaker Work, Millwrighting, Welding.

Prefer College Graduate.

State experience record and salary expected.

California location.

P 5103 Engineering News-Record
1111 Wilshire Blvd. Los Angeles 17, Calif.

DESIGN ENGINEER

Graduate mechanical engineer with at least five years' experience in Sheet Metal Building fabrication. Well established company located in major Midwestern city. Salary open. Age 32-44. Write full particulars to

P-5175, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

DESIGN ENGINEERS

Excellent opportunity for Engineers experienced in design of Filter Plants and Water Works—Bridges and Highway. Recent Graduates also accepted. Good living conditions and Bonus and Pension Plan. Include experience, date available, salary desired in first letter. Gannett Fleming Corddry & Carpenter, Inc., Box 386, Harrisburg, Pa.

BRIDGE ENGINEERS

Designers—5 years experience in both steel and concrete.
Recent Graduates — Structural majors, preferably with Master degrees.
Highway Engineer—Familiar with interchange layouts.

FRANK D. McENTEER
504 Baltimore Avenue, Clarksburg, W. Va.

DRAFTSMEN

Experienced structural steel detailers and checkers for building work and conveyor detailing. Consulting office with good working conditions, vacation plan, payed holidays, and hospitalization program. Please send complete written information in first letter.

SAMBORN, STEKETEE & ASSOCIATES
1214 Cherry Street Toledo 4, Ohio

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$1.80 cents a line, minimum 3 lines. To figure advance payment count 5 average words as a line.

POSITION WANTED undisplayed advertising rate is one-half of above rate, payable in advance.

PROPOSALS, $1.80 a line an insertion.

INFORMATION:

BOX NUMBERS count as 1 line additional in undisplayed ads.

DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

EQUIPMENT WANTED or FOR SALE Advertisements acceptable only in Displayed Style.

DISPLAYED—RATE PER INCH:

The advertising rate is $20.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. E.N.R.

Send NEW ADVERTISEMENTS: To New York Office, 330 W. 42nd St., N. Y. 36 for February 3rd issue closing January 24

WANTED—EARTHMOVING SALES REPRESENTATIVES

Responsible positions open for qualified experienced sales representatives in connection with expanding sales program. Headquarters in Midwest and Mid-Southwest. Knowledge and experience with heavy earthmoving equipment essential. Civil engineer graduate preferred. Send complete qualifications and recent photograph to:

Mr. R. W. Christofferson, *Sales Dept.*
WOOLDRIDGE MANUFACTURING CO.
Sunnyvale, California

AGENTS WANTED

Steel Joist Manufacturer, member S. J. Institute has attractive proposition for local representatives capable estimating and selling steel joists. Write

RW-5136, Engineering News-Record
330 W. 42 St., New York 36, N. Y.

POSITIONS VACANT
(Continued from preceding page)

GRADE FOREMAN familiar with all types of heavy excavation and grading. Good opportunity. Work in central N. Y. State. Experience references. P-5096, Engineering News-Record.

CARPENTER FOREMAN, familiar with all types of bridge work. Good opportunity with good concern. P-5098, Engineering News-Record.

WANTED—CIVIL Engineering graduate for half-time work in prestressed concrete research at university in eastern Pennsylvania. Opportunity for MS or PhD degree. Salary $120. per month with tuition paid. Address reply to P-5021, Engineering News-Record.

JUNIOR CIVIL Engineer wanted by the City of Highland Park, Michigan. Salary $4472.00 to $4825.00. Retirement, sick leave and vacation benefits. Apply room 4, 30 Gerald, Highland Park 3, Michigan.

SALES ENGINEERS—Experienced in estimating reinforcing bars and steel joists—should have some sales experience. Good openings with nationally known company. Write giving full details of experience, education, desired salary. P-5132, Engineering News-Record.

SALESMEN WANTED—Crane, shovel, and front end loader experience desirable. North Jersey territory. Salary open. Reply P-5158, Engineering News-Record.

DRAFTSMEN, STRUCTURAL. Midwestern structural fabricating plant has permanent openings for young draftsmen with at least three years experience in detailing structural and miscellaneous for all types of buildings and highway bridges. All employee benefits, insurance, paid vacations, etc. Reply by letter stating experience and salary requirements to P-5171, Engineering News-Record.

CONSIDERING TOP Administrative and Supervisory personnel in categories of Project manager, job superintendent, general superintendent, coordinator and chief engineer preferably with experience on foreign projects in Spanish speaking countries. Send resume to P-5123, Engineering News-Record.

CONSTRUCTION ENGINEER. Growing Alabama contractor wants proven earner to estimate, bid and personally supervise medium size construction. Nominal salary and share in earnings. Only men with highest qualifications considered. Include education, experience, references and earnings expected in first letter. P-5204, Engineering News-Record.

CONSTRUCTION SALES ENGINEERS

One of our clients, who is expanding operations, has openings for several sales engineers to procure negotiated construction contracts throughout the eastern and central United States. Applicants should be free to travel. Excellent earnings possible, commensurate with proven background and ability.

Our client is interested in and capable of performing quality work in building new industrial plants and buildings, large apartment houses, as well as piers and bridges, and participates in their financing.

If you have a successful background in similar work or intangible sales and would be interested in joining an organization which has shown steady growth for the last 20 years, please submit a detailed resume of your past work history, including a recent small photo of yourself. All replies held strictly confidential.

Write to—
METHODS ENGINEERING COUNCIL (Management Consultants)
718 Wallace Ave., Pittsburgh 21, Pa.

POSITIONS VACANT

WANTED: MECHANIC, familiar with all types of heavy road equipment. Some ability to operate same. Work in central New York. P-5093, Engineering News-Record.

EMPLOYMENT SERVICE

SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1929, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. L, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

AVAILABLE REGISTERED Illinois professional civil engineer and land surveyor. Excellent supervisory experience in heavy industry and construction. Will travel. Age 41. PW-4981, Engineering News-Record.

ENGINEER EXECUTIVE age 40. B.S.C.E., registered several states, married, top administrative and management background industrial and chemical projects. Know customer-labor relations, contract negotiation-sales. Positions field eng'r., supt., project manager and staff level assignment U. S. and abroad. Well connected. PW-5012, Engineering News-Record.

CONSTRUCTION EXECUTIVE, available as project manager, on large operation, chief estimator for large organization or in other executive position where scope warrants employment of top man, thoroughly experienced on all types of construction and in every phase of general contracting. PW-5074, Engineering News-Record.

CIVIL ENGINEER age 37. Long experience in heavy construction. Also municipal, highway and office. PW-5000, Engineering News-Record.

CONSTRUCTION STIFF, Rigger, who has worked with lubricating oil for years as a hobby, seeks employment in a modest capacity, with a construction company, or other fleet owner using large quantities of oil, where his information and paraphernalia will be investigated, and where he will be encouraged to go ahead with some things he wants to do. Local or foreign. Sidney Stribling, Sta. 8, Asan, Agana, Guam, M. I.

CIVIL ENGINEER, 15 years municipal engineering and construction, zoning, inspections, etc. Age 38, Reg. P.E., BSME, 3 years CE courses, holding responsible administrative position several years. Desires consulting, construction, municipal fields, with future. PW-5072, Engineering News-Record.

CONSTRUCTION ENGINEER, N. J. license; 27 yrs. varied experience; steam generated power plants, industrial buildings, heavy foundations and water front facilities. Supervise various trades and sub-contractors, estimate, prepare reports, etc. Available immediately. PW-5113, Engineering News-Record.

POSITIONS WANTED

CONSTRUCTION ENGINEER — C. E. Grad. Reg. Prof. Engr. 21 years experience 11 of which as supt. of const. Also experienced estimator. Know job pushing, equipment, cost control. Experience about ⅓ building ⅔ heavy—big jobs and small. Available March 15. PW-5124, Engineering News-Record.

CIVIL ENGINEER: Three years heavy experience in all phases of highway work, for prominent consultants. Needs responsible job with a future. Family man, but will relocate in N.E. PW-5191, Engineering News-Record.

ASSISTANT SUPERINTENDENT, CE, 25, five years bridge highway and building experience. PW-5192, Engineering News-Record.

HIGHWAY DESIGNER experienced in charge of design primary, toll, and municipal projects. Prefer South or Southwest. PW-5180, Engineering News-Record.

ESTIMATOR—BUILDINGS. Graduate CE. Six years office and field experience. Best references. PW-5184, Engineering News-Record.

ENGINEER, CE, PE. Estimate, price, detail design, field supervision. Layout all phases reinforced concrete work. 10 yrs. exp. PW-5186, Engineering News-Record.

PROMOTION—SALES: 16 years of general civil engineering: field, office, specifications: concrete, and bituminous concrete design. Desirous of change to So. Calif. Will submit resume. PW-5147, Engineering News-Record.

(Continued on opposite page)

LEARN ESTIMATING

Complete Building Estimators Course, also Building Labor Calculator for practicing estimators. Thirty-fourth year serving the building industry. For free trial and all particulars write:

TAMBLYN SYSTEM
1420 Gilpin St. Denver 6, Colorado

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ARCHITECTURAL ENGINEERING
OUR COURSES of instruction by mail HAVE HELPED THOUSANDS to better positions and to pass State Board Examinations. Forty-third year.
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Learn latest methods to organize and run work. Prepare for the top jobs.
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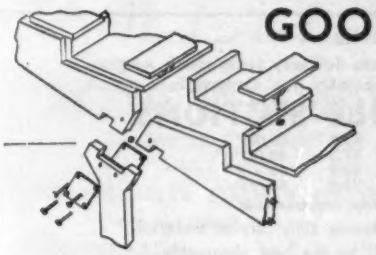
GEO. E. DEATHERAGE & SON
CONSTRUCTION CONSULTANTS
411 So. 5th Ave. Lake Worth, Florida



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Highly profitable franchises available for Sales and Construction of patented, pre-cast concrete Grandstands on a royalty basis. Tremendous sales potential already proven. For use by schools, colleges, county fairs, race tracks, rodeos, etc.

This operation necessitates companies or individuals capable of handling large volume contracts and having experience in sales promotion work. Send for brochure.

• Over 40 "CASTADIA" have been built in the Mid-West

Contact——— **CASTADIA, INC.**
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(Continued from opposite page)

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CIVIL ENGINEER, BSCE, 30 registered, 6 years experience in responsibile municipal and municipal consulting positions on pavement, sewerage and water. Desires relocation in northern midwest with municipality or consultant. PW-5166, Engineering News-Record.

CIVIL ENGINEER, 28, B.S.C.E. Reg, 6 years experience heavy construction — dams and bridges as office and project engineer desires opportunity as estimator. PW-5163, Engineering News-Record.

CONSTRUCTION ENGINEER — Graduate and registered. 15 yrs responsible experience hydro-power, steam plant and general industrial construction. PW-5164, Engineering News-Record.

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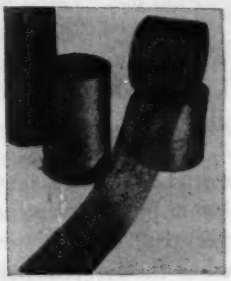

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EDITORIALS

A practical highway program

DETAILS of the recommendations of the Clay Committee to President Eisenhower as to how his "Grand Plan" for highway development should be inaugurated were made public last week. The committee's chief recommendation—that federal participation in the President's proposed $54-billion ten-year expansion in highway building be concentrated on the 40,000-mile interstate highway system—comes as no surprise to those who have tried to determine how the federal government could insure the undertaking of such a great program short of footing the entire bill. The only answer appeared to be that it can't. If the states are to share in the cost, that sharing must be on a purely voluntary basis and must follow the pattern prescribed by each state's constitutional requirements, which vary widely. The federal government can offer inducements, but it cannot require any state to appropriate money.

Under these conditions, the Clay Committee concluded that the federal government would be justified in footing practically the entire bill for needed work on the 40,000-mile interstate highway system because that system is vital to the nation's economic development and to its defense. Consequently it proposed to the President that the federal government pay $25 billion of the $27 billion that should be spent on that system to bring it up to adequate standards.

That plan has this great advantage: It will insure much faster modernization of the basic interstate network than would be possible if the states were to be required to provide a larger part of the cost. The work may now be completed in the ten-year period set as an objective by the President.

Also, the state funds that otherwise would have been spent on the interstate system under the regular federal-aid program will be released for work on highways that are not part of the interstate net. This will help the states in providing early correction of the worst deficiencies in their state highway systems.

Nevertheless, if the President's objective of adding $54 billion to the normal spending of $47 billion on the nation's highways over the next ten years is to be met the states still must raise $29 billion in addition to what they must raise as their share of the regular $47 billion program.

That is a big order. How ready are the states to meet such a program?

No single answer can be given to that question, but a survey ENR has just made of legislation expected to be considered by the state legislatures that will be in session this year indicates that many are planning to expand their roadbuilding programs.

Only a few states have special authorities that can issue bonds for such purposes outside the normal state debt. All the others that need more money than can be raised by increases in the state's motor-fuel taxes probably will have to resort to bond issues or to setting up special financing authorities. Generally either action will require a referendum. Also, some states have constitutional provisions against issuing bonds to finance such work as roadbuilding.

The Clay Committee made one proposal that will be a help to states that have built toll roads or can obtain private capital for toll-road construction. Wherever existing toll roads or a proposed toll road can be integrated with the interstate system—thus relieving the federal government of building that much of the system—states are to be given credit for that work. This money may not be used to retire toll-road bonds. It must be spent on new highway construction.

As the toll roads built or having good prospects for being built with private funds all are in the populous states where traffic congestion is most widespread, this money should be very useful in helping to correct bad highway conditions at an early date.

Fear that the committee's recommendations would foster a lot of new toll-road projects appears groundless. New toll-road projects still must be able to show enough potential income to attract private capital.

To sum up, the President's Advisory Committee for National Highway Program has taken a very practical approach to a difficult problem. True, it has not come up with proposals that hold promise of producing the entire $54 billion needed to give substance to the President's "Grand Plan." But if producing that sum is beyond sound federal fiscal policy, then that fact should be made known to Congress and the state legislatures and governors as they take up consideration of highway legislation. In this respect, as in all others, the Clay Committee discharged its responsibility to the President and to the nation in a manner deserving of the highest praise.

Commendable self help

LACKING adequate office space for its headquarters in Washington, the National Society of Professional Engineers has set out to raise $400,000 from its own membership to finance construction of a building designed to meet its needs for many years to come. The plan is to raise most or all of the needed money through the sale of Building-Fund Participation Certificates bearing 4% interest. If the money can be so raised, a new headquarters for the society can be provided with minimum trouble and at minimum cost.

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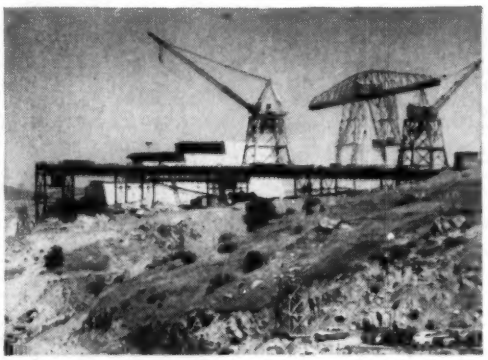
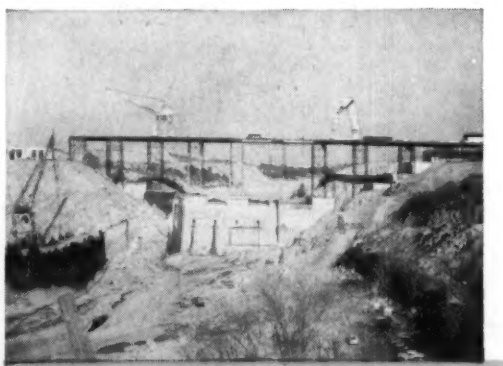
Above: An artist's conception of Folsom Dam. (1) The concrete main structure. (2) Million-acre feet reservoir. (3) Power house and tail race. (4-5) Folsom prison. (6) Auxiliary rock fill. (7) Earth fill.



As equipment removes 40-60 feet of sand and gravel to get to bed rock, the main trestle is readied for the push across the canyon.



Five months later, the dam rises on canyon floor. Gantries and trestle speed handling of concrete. Abnormal floods caused a delay in the work.

WITH 25,000 cu. yds. of concrete going into the main structure each week, Folsom Dam is speeding toward completion. In spite of floods and other natural delays, contractors Merritt-Chapman & Scott and Savin Corporation have kept work on schedule.

The huge dam, built to provide flood control, irrigation and power on the American River near Sacramento, is a $29.4 million project of the Corps of Engineers. The structure will contain 1,200,000 cu. yds. of concrete and will stretch out for a quarter of a mile with flanks protected by another 1¾ miles of rock and earth fill. More than 9,000,000 cu. yds. of earth and rock will have been excavated and 800,000 cu. yds. of selected fill will have been put into place when the dam is completed.

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